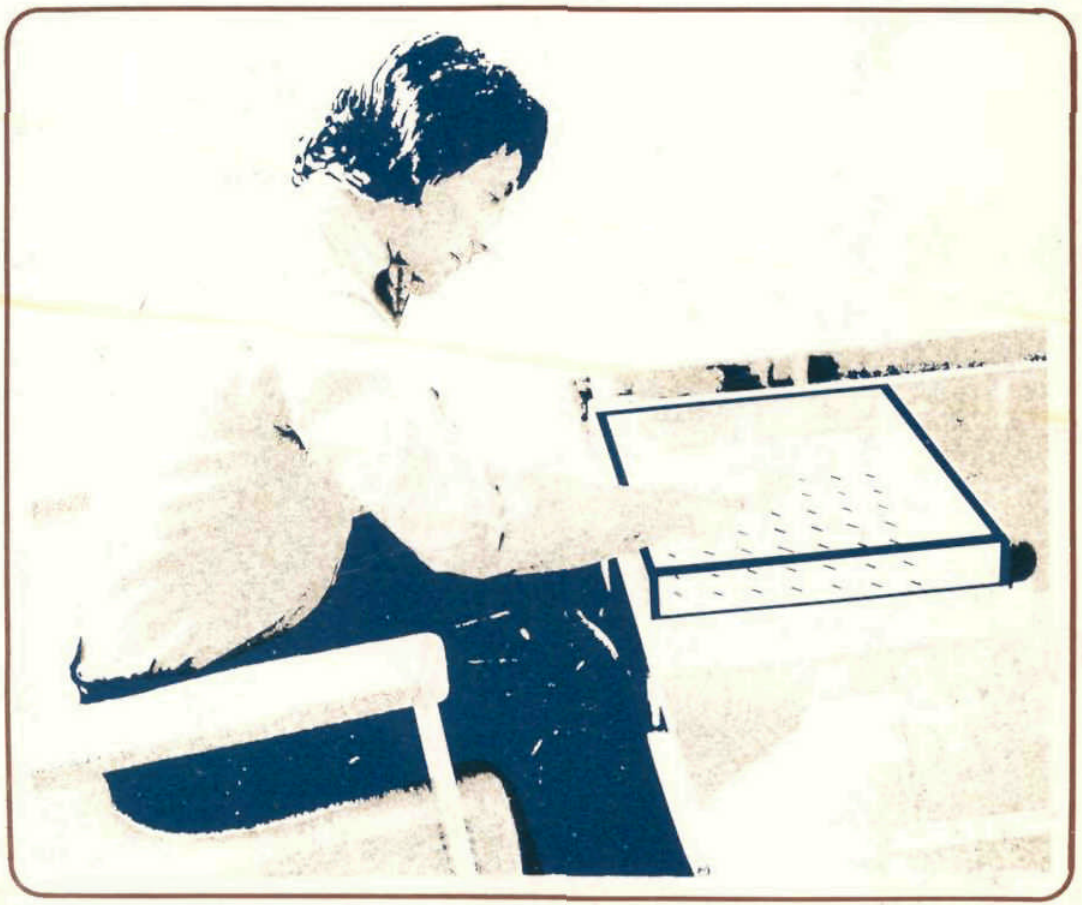
the Skeptical Inquirer

THE ZETETIC



Evaluating Parapsychology

Chariots of the Gullible / Tunguska Echoes
Ancient Chinese Space Flight?

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THE ZETETIC

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News and Comment

Clues in "remote viewing"

Two New Zealand psychologists have examined transcripts from the much-heralded remote-viewing experiments conducted at the Stanford Research Institute (now SRI International) and concluded that multiple clues contained in them can account for the successes reported.

The original experiments, by Russell Targ and Harold Puthoff, have been described in their book *Mind-Reach* (Delacorte, 1977) and in reports by them in the *Proceedings of the IEEE* (64:329, 1976) and in *Nature* (252:602, 1974). From the results, they concluded that extrasensory remote-viewing ability had been demonstrated and may be widespread in the general population.

David Marks and Richard Kammann of the Department of Psychology at the University of Otago in Dunedin, New Zealand, now report in *Nature* (274:680, August 17, 1978) that their examination of the original unedited transcripts and their own duplicate experiments have failed to confirm that conclusion. In fact, they say their work indicates that the originally reported results may be entirely due to extraneous clues contained in the transcripts used by judges to evaluate the accuracy of the remote viewings.

In the SRI experiments, a subject would remain with an experimenter at the SRI laboratory and at a prearranged time attempt to describe an undisclosed, remote site being visited at that moment by a team of two to four co-experimenters. Nine such sites were used. Independent judges were then given the subject's descriptions and a list of the nine sites. The judges visited each target location in turn, then chose, from the set of nine, the best description at each location. Then they ranked the accuracy of the descriptions.

In a visit to SRI, psychologist Marks attempted to duplicate the ranking procedure used by the judges. Although it was not so stated in the original reports, he found that the judges had been provided with a list of targets in the correct original sequence and that, in addition, "a large number of cues were available indicating the position of a transcript in the series." In one, for instance, Targ mentions the nature reserve visited the day before and says, "Nothing like having three successes behind you." Other typical references were to the "second place of the day" and "yesterday's two targets."

Using these and other cues, Marks was able to exactly match the five transcripts he examined to the five correct targets. "In this procedure it should be noted that I had never visited any of the five locations but completed the task solely on the basis of cues contained in the transcripts."

A further experiment attempted to

determine whether target sites could be correctly identified from the transcripts without using the extraneous cues. The cues were removed from the transcripts, and two judges, both research psychologists, visited five targets in a random sequence and independently ranked the five transcripts at each location. Each judge made a detailed content analysis of the descriptive information in the transcripts and ranked them on the basis of the descriptive accuracy of the information available. The results did not differ significantly from chance.

"These results," say Marks and Kammann, "provide a striking contrast to the correct matchings obtained when the cues from the unedited transcripts were used in making the judgments. The null result also contrasts with the significant matching obtained with unedited transcripts by the original SRI judges."

It would be difficult, they suggest, for the judges to ignore the clues contained in the transcripts. They suggest that the judges, who considered themselves to be operating "blind," used the extraneous cues to form hypotheses that were then subjectively validated by the transcript as a whole. Marks and Kammann report that in their work with remote viewing they have often observed "the occurrence of strong subjective validations, a selective awareness of similarities between the subject's description and the target location, once the correct match was revealed, even though the same transcripts produced random matches when judged blind." They also point out that in published reports the illusion of a good match can be magnified by use of post hoc photographs of the location and by selecting particular excerpts from the transcripts.

"Our investigation of the SRI remote-viewing experiments," conclude Marks and Kammann, "forces the conclusion that the successful identification of target sites by judges is impossible unless multiple extraneous cues, which were available in the original unedited transcripts, are used." They caution future investigators to ensure that such cues are not available and that judges not be given the location of targets in the same sequence that occurred in the experiments.

"Until remote viewing can be confirmed in conditions that prevent sensory cuing, the conclusions of Targ and Puthoff remain an unsubstantiated hypothesis. Our own experiments on remote viewing under cue-free conditions have consistently failed to replicate the effect."

Puthoff has lately been insisting that the sort of cues Kammann and Marks discuss in their paper were edited out of the transcripts before giving them to the judges. This, however, is directly contrary to what he and Targ have previously published and what they previously told Marks.

—Kendrick Frazier

A science reporter protests

When George Alexander, veteran *Los Angeles Times* science writer and current president of the National Association of Science Writers, came across a wire-service story on the extra-planet theories of Zecharia Sitchin that he considered naive and credulous, he didn't just sit back and stew about it. He fired off a critical letter to the president of United Press International, then submitted the exchange for publication in the *NASW Newsletter* (Sept.

1978), which in its new format is striving to become a review of science journalism.

The dispatch, by Marcia Stepanek, a general reporter, not a science writer, moved on the UPI wires on July 28, 1978, from a world conference of the Ancient Astronauts Society, in Chicago. It reported statements made by Sitchin, a New York businessman and author of *The 12th Planet* (see James Oberg's review in our Spring/Summer 1978 issue), to the effect that mankind may have come from a giant planet, Marduk, "which orbits the sun far beyond the last known planet." It quoted Sitchin as saying: "There is mounting astronomical evidence that there exists one more planet within our solar system. It is a planet many times the size of Earth and the discovery of this planet will confirm ancient beliefs in its existence." The story passed along his claim that inhabitants of Marduk may have "genetically created mankind." It even had Sitchin twisting the U.S. Naval Observatory's discovery earlier that month of a probable moon around Pluto into evidence for the planet, saying that "Naval Observatory astronomers are beginning to share his view."

Alexander wrote: "In its naiveté and imbalance, this story is precisely the sort of journalism which makes professional scientists grimace in disgust, and science writers, in despair. Ms. Stepanek, having obviously accepted Zecharia Sitchin's bizarre—to say the least—theory as credible and consistent with reality, can only encourage similar erroneous beliefs among the impressionable readers in our society. . . . Nowhere . . . is there a quote or a statement from a responsible scientist which would throw a pail of cold logic on Mr. Sitchin's highly speculative ideas, or at a bare minimum suggest that the silly claims of this individual be taken with a large shaker of salt.

"I don't quarrel with UPI's decision to cover the Ancient Astronauts Society's meeting. But I do quarrel with Ms. Stepanek's uncritical handling of such a patently preposterous claim and her apparent ignorance of the old '10th planet' theory so long favored by the nuttier fringes of the UFO crowd. . . . This kind of story does no one any good. . . ."

UPI Vice-President H. L. Stevenson responded that the story did contain several references warning the reader to take Sitchin's theory "with a grain of salt" but said Alexander's point was well taken. "United Press International shares your zeal for accuracy and balance in all science copy. . . ."

Alexander says he considers the story poor and the UPI defense "mealy-mouthed." At any rate, a major news organization has been put on guard that stories on fringe science and pseudoscience need to be handled with more sophistication and that a credulously written story by a general reporter is not going to be merely ignored by the science-writing community.

—K.F.

The Gallup UFO polls

Usually it is difficult to check the accuracy of public-opinion surveys because of the "transient" nature of the subject-matter. For example, a poll of a president's popularity today when compared with the figures for six months earlier can only be used to note

an apparent change, not to check the accuracy of the survey.

But three different surveys of American adults on the subject of unidentified flying objects (UFOs) conducted by the American Institute of Public Opinion, headed by Dr. George Gallup, in 1966, 1973, and 1978, do provide a benchmark for comparison. The results of an analysis of these three surveys suggest that one ought to be cautious in accepting poll results as fact.

In the 1966 poll, 5 percent of the adults surveyed, when asked "Have you yourself ever seen anything you thought was a flying saucer?" responded that they had. Based on the U.S. adult population at the time, this indicated that approximately 5 million American adults had at some time seen a UFO.

The 1973 poll, taken at a time when the nation was in the midst of a major "UFO flap," indicated that 11 percent of the nation's adults had themselves seen a UFO. Based on the U.S. adult population at the time, this corresponded to 15 million persons who claimed to have seen a UFO—or an increase of 10 million!

If these figures are even grossly representative, they reveal that during the 7-year interval between the two polls there were twice as many UFO sightings in this country as had occurred during the 19 years between the first report of a UFO, in mid-1947, and the first Gallup UFO poll.

Assuming that there were an average of two observers per UFO sighting, this works out to an average of *nearly 2,000 UFO sightings in the United States for each and every day between 1966 and 1973.*

Yet according to J. Allen Hynek, director of the Center for UFO Studies, "there are about 100 sightings worldwide in any given [24-hour] period." If these are prorated on the basis of population, this would imply an average of only 5 UFO sightings per day in the United States, compared to the nearly 2,000 a day implied by the 1966 and 1973 Gallup polls.

It is interesting to compare the Gallup figure with the results of a survey of 2,611 members of the American Astronomical Society (AAS) conducted by Dr. Peter A. Sturrock of Stanford University in 1976. (See *The Zetetic*, Fall/Winter 1977.)

Because many astronomers spend much more of their time in sky-gazing than does the general layman, one might expect that a much higher percentage of AAS members would report having seen a UFO. Yet the Sturrock survey showed that barely 2 percent of the astronomers had ever seen what might be termed a UFO, compared to 11 percent for the public at large, according to the Gallup poll.

On June 15, 1978, Gallup released the results of another UFO survey, which indicated that only 9 percent of those polled had ever seen a UFO, corresponding to 13 million U.S. adults. This seems to indicate that UFOs had been seen by 2 million fewer Americans in 1978 than in 1973.

If the Gallup polls on UFOs seem to be flawed in this respect, they certainly are flawed in another. In each of the surveys, persons were asked: "In your opinion, are UFOs something real or just people's imagination?"

Experienced UFO investigators, whether they be "skeptics" or "believers," know that most UFO reports involve something that is very "real." The trigger mechanism may be Venus

or another bright celestial body, a weather balloon, a meteor-fireball, or a hot-air balloon built by ingenious teenagers, to cite but a few of many possibilities.

For persons surveyed to have opted for "just people's imagination" would indicate that they believed that *all* persons, including President Jimmy Carter, who have reported seeing something they could not identify were either hallucinating or outright hoaxers, which clearly is not true.

Thus the American Institute of Public Opinion's survey question was very badly phrased if its intent was to determine what segment of the American public believes UFOs are extraterrestrial visitors or other even more exotic phenomena. Yet the results of the survey are often cited as "proof" that the majority of U.S. adults "believe in UFOs."

On June 3, 1978, as chairman of the Committee for the Scientific Investigation of Claims of the Paranormal's UFO Subcommittee, I wrote to Dr. Gallup pointing out the ambiguity of the wording of this question and suggested that it be rephrased in any future UFO surveys. As of this date, no reply has been received from Gallup or from the American Institute of Public Opinion. But I await the results of the next Gallup poll on UFOs.

—Philip J. Klass

The lessons of an "IFO"

Some investigators of UFO reports have argued that once a particular UFO is identified—thus becoming an Identified Flying Object (IFO)—it is of no further interest or value. But that is not true, for a comparison of the later discovered actual facts with the earlier reported eyewitness observations is frequently both fascinating and instructive.

Just such a case occurred earlier this year in the western Chicago suburb of Aurora. On the night of April 29, 1978, ten different persons called the Aurora police department to report a UFO overhead. The reported observations all were between 10:30 PM and midnight.

Allen Hendry, editor of *International UFO Reporter*, investigated the incident, interviewing the eyewitnesses. In his publication's June issue he presented an interesting and valuable report on the case, which, he points out, was "rich in the elements that are traditionally supposed to underwrite the value of a genuine sighting."

One couple claimed to have had a "close encounter" with the object, which they said appeared to be a saucer. The couple—he calls them Mr. and Mrs. S.—stopped their car to watch the saucer. Other people around them were also pointing to it. The couple drove home to get their neighbors, the saucer following them. Both Mr. and Mrs. S. agreed that the saucer flew over their car at treetop level. It even had to angle upward to avoid hitting the trees. The sketches they prepared showed a round object they said was intended to represent a saucer body with a dome on top and lights surrounding it. All the witnesses said the lights rotated around the object. Size estimates varied from 25 feet to the size of a football field, which led to the speculation that some people were seeing the "mother ship," and the others, smaller versions.

The object hovered motionlessly, something, said Mrs. S., that "no airplane can do." After some time, the

object suddenly shot off eastward "in the blink of an eye," all in silence. The S.'s neighbors noted that their TV set blanked out at about this time.

Hendry found the witnesses still in a turbulent emotional state when he talked to them. Mr. and Mrs. S. said they couldn't sleep that night. Mrs. S. said she believes in UFOs now and didn't want to see another one. Their neighbor told Hendry he still "gets chills" thinking about it. An 11-year-old child in another family hid behind the carseat at the time.

The case had some familiar elements in it for Hendry, however. The description of rotating lights was one clue. He had received many such calls reporting exactly the same thing over the past two years.

Hendry called an advertising company in Chicago that operates light planes that have a frame carrying a series of 315 light bulbs that go on and off in sequence to write out advertising messages. Three hundred calls of UFO reports to Hendry's office have later been confirmed to be due to flights of these planes at night; and in 90 percent of them, says Hendry, the witnesses described not what was perceptually available to them but rather a disc-shaped form that is itself rotating with fixed lights. Many of them say they see a dome on top. Some insist they can make out the dome clearly.

In this particular case, yes, indeed, the advertising company did have an illuminated plane circling the town at the time of the UFO reports. The reports were clearly due to these aircraft. As for the family's TV that went off during the incident, Hendry found that the TV station had had technical difficulties at their end and had later broadcast an apology.

The point is not that another UFO case has been solved, but that the solution illustrates so vividly the difficulties with much eyewitness testimony on the subject, even from well-meaning persons—which goes to the heart of the entire UFO problem.

This case, notes Hendry, is a prime example of "the pervasive emotional climate that appears to be surrounding the entire UFO subject, one that succeeds in distorting even the most commonplace sightings into exaggerated 'miracles.'"

Some of the reported descriptions that night are understandable. When such an illuminated aircraft is seen from an angle, an observer on the ground sees not the message but only a row of lights flashing from one side to the other. The absence of sound is due to the very slow speeds at which the pilots fly, and that also accounts for reports of "hovering." But the other discrepancies between fact and perception are so wide that they carry a lesson for everyone who tries to form conclusions about dramatic reports of UFOs in the night sky.

As Hendry concludes: "None of this rationale begins to 'explain' the distorted observations regarding 'domed discs,' 'treetop height,' gigantic-size estimates, claims of being deliberately followed in cars, false assumptions that the plane's sign turning off was equal to the UFO rushing away faster than the eye could follow, the causality attempted between the UFO and the TV interference, and, most of all, the wholly unwarranted emotional reactions exhibited by the eyewitnesses and the immediate, nearly universal conclusion that the advertising plane was from outer space. The key issue here is *not* that the sighting

was 'only an ad plane,' because such a 'solution' cannot in itself account for the independent witnesses' behavior and inaccuracies. I do not see this IFO as the 'garbage' to be weeded out while the 'real' UFOs are retained as 'data,' when there is a wealth of evidence present here about UFOlogy's old bugaboo: the reliability of human testimony."

—K.F.

Soviet research in "Triangle"

Several Soviet oceanographic research vessels have recently been combing the waters of what some writers call the Bermuda Triangle, and cosmonauts on board Salyut 6 have been photographing the region extensively. Lest anyone suspect something mysterious (outside of the possibility of Soviet military-intelligence interests in submarine operations in these waters), *Pravda* mentioned the purposes of these activities last August. One should be reminded that just because something appears in *Pravda* it is not necessarily propaganda, a fabrication, or similar drivel (their weather reports are usually pretty good).

"The crew carries on photography of the planet," begins the relevant paragraph (translated by J. Oberg), discussing the value of space-based photoreconnaissance of earth resources and earth sciences, such as oceanography and meteorology. "For example, photography of the Bermuda Triangle. No, it is not those mythical 'mysterious' events—disappearances of ships and planes, or 'flying saucers,' of which so much has been written by the fantasizers but which have never been seen by our cosmonauts or by the Americans—that interest scientists in this region. It's just that here processes form that influence the climate of the whole planet. . . ."

There's nothing surprising in this brief paragraph, but it is worth noting because of a favorite trick of those "fantasizers" referred to. When far-out Russian gossip is reported as "inside information" in UFO books and magazines, it is frequently claimed that "Moscow has never denied the truth of this story," thus somehow insinuating that Moscow has *tacitly admitted* the truth of such stories. Well, they can't do that in this case, at least not anyone who believes what they read in *Pravda.*

—James Oberg

Soviet "jellyfish UFO": Part Two

Readers may recall that a year ago (Fall/Winter 1977) we published the explanation of the strange and spectacular "jellyfish UFO" seen over the northwestern Soviet Union in the early morning hours of September 20, 1977. The display, which had received worldwide press attention, turned out to have been caused by the launch of the Soviet spy satellite Cosmos 955 from the base at Plesetsk, when conditions were just right to produce the stunning atmospheric effects noted. James Oberg's detailed analysis, making use of his knowledge of Soviet space activities and of U.S. information about the launch, was one of the most clear-cut identifications of a formerly unidentified flying object ever made. The location, time, and direction of the secret launch and of the observed reports corresponded exactly.

The explanation was disseminated widely in news stories by United Press International, *Science News*, *Sky and*

Telescope, and *International UFO Reporter*. An optimist might have thought that would be the end of it. One case, at least, solved.

But don't expect the *National Enquirer* to think that way. To it, apparently, a mystery solved is a solution ignored. It sent two reporters off on a 16-day investigative trip to the Soviet Union, who returned with tales that the reported beam of light had drilled holes in windows and cobblestones. As might be expected, all samples of this damage had already been shipped away to some secret location, so they were not able to inspect any actual physical evidence. There were also reports of panic, of people chasing after the UFO, and of vehicles stalling or going out of control.

Feliks Zigel, regarded by many in the West as Russia's leading UFO expert, told the reporters that "without a doubt" the jellyfish UFO was authentic. "It had all the features." Another often-quoted Soviet UFO specialist, Aleksey Zolotov, said: "In my opinion, the object was a typical flying saucer. The available reports left no doubt whatsoever in my mind. I myself know it was a UFO." (The satellite-launch explanation had not been published in the Soviet Union; the existence of the Plesetsk base is supposed to be a secret.)

The situation is interesting because, in this case, as Oberg says: "We are utterly certain what the so-called UFO really was. This gives us a rare standard against which we can calibrate the reliability of 'car stalling' stories, 'hysterics,' 'car chase' stories, and other 'physical evidence' which often reportedly accompany UFO incidents elsewhere. We can conclude that the apparently corroborative evidence is actually totally worthless." This, he adds, is indeed a prominent feature of UFO reports in general.

—*K.F.*

Psychic Vibrations

We often hear it said that the "serious" study of UFOs is a young science, struggling valiantly for the official recognition that it so truly deserves. If this is so, why does the leader of the UFO movement, astronomer J. Allen Hynek, always back down from speaking engagements and television appearances upon learning that Philip J. Klass, the leading UFO skeptic, will be present to challenge him? One of their most amusing nonconfrontations occurred earlier this year when Hynek had agreed to speak to the students of the State University of New York at Buffalo—for his usual fee of $1,500 for a one-hour lecture. The Student Association then decided to invite Klass to be present too, giving each speaker equal time to present his own views. Learning that Klass had accepted, Hynek immediately refused to participate. The chairman of the Student Association's Speakers' Bureau stated: "Unfortunately, Dr. Hynek has vehemently rejected any offer to debate. I originally offered Dr. Hynek his usual speaking fee of $1,500, then raised my bid to $1,800, which he still refused, and my final bid of $2,000 was also refused. Klass, on the other hand, was more than anxious to debate Dr. Hynek, and said that he would come up to Buffalo for expenses, and even implied that he would come up for nothing! I feel that it is unfortunate that the students of this university cannot see these two men debate. Dr. Hynek's refusal has certainly caused me to reevaluate my feelings on whether UFOs even exist."

* * * * *

Those who say that there has been little progress in the occult sciences in recent years are dead wrong. An entirely new, previously unsuspected realm of psychic research has just been pioneered: the photography of guardian angels. A psychic group in Minnesota, "Search and Prove," has released an out-of-focus photograph of the face of a bearded, distinguished-looking man, which they claim to be the face of the guardian angel Jeremiah. Unfortunately, the photo does not extend down to wing level. How does one go about photographing a guardian angel? During a seance, they use an instant camera to snap pictures of the darkness, without using any flash; the face somehow appears. When the results of these researches were published in the popular tabloid newspaper *Midnight/Globe*, the reader response was so overwhelming that a follow-up feature was published, this one displaying a photograph of a second guardian angel, a dark-haired female angel named Anna. *Midnight/Globe* reports that, after telling "of their encounters with guar-

dian angels, [the psychics] were afraid of being ridiculed . . . [but] far from ridiculing the idea of guardian angels, our readers wanted to know more." Jim Vogt, one of the members of the group, tells of receiving a tremendous volume of mail from all across the United States and Canada. "It is unbelievable just how many people are interested in the subject of angels. Most of them are so thankful there is finally a group of people who are not afraid to tell about their experiences."

* * * * *

The flap of fairy sightings from our own twentieth century, reported in this magazine a few issues back, continues unabated. In its March 1978 issue, *Fate* magazine reported a multiple-witness sighting of a "leprechaun." He was about ten inches tall and was spotted in a patch of weeds, with his knees drawn up to his chin. Both witnesses gave the same description of the leprechaun: "green clothes, a long, thin, curved golden pipe between his lips, and a flopped-over conical cap." Last year, SITU—the Society for the Investigation of the Unexplained—published an account of a flap of fairy sightings in the vicinity of Dunn, North Carolina. A young woman, returning from an all-night party just before daybreak, reportedly saw a little man standing outside her house. She ran to wake up her mother next door, who "swore she must be drunk." She later found what was said to be a footprint left by the fairy (the existence of tangible evidence makes this a "fairy encounter of the second kind"). Unfortunately, before the footprint could be studied, it was accidentally destroyed by the woman's baby son. In the same area, an eight-year-old boy reported seeing a little man "not much bigger than a coke bottle," who also reportedly left behind footprints. The boy's father is reluctant to have his son undergo either a polygraph test or hypnotic regression, for fear that the experience might make the boy "nervous." The SITU investigator proclaims that "doubters are hard-pressed to explain away the footprints found at the scene of the sightings."

* * * * *

Former astronaut Gordon Cooper, who is rapidly becoming one of the big guns of the UFO movement, appeared on the Merv Griffin show this past April 10, where he discussed his ideas about UFOs and space travel. "I think we're going to see some significant propulsion breakthroughs in the next short number of years that hopefully will get us to Mars in an hour, hour and a half, two hours." The audience laughed. "But it's for real," Cooper insisted. However, he was not yet finished with the subject. Into his mouth went the other foot, as he gleefully exceeded the speed of light by a factor of 10,000,000,000,000,000,000,000,000: "The speed of light is 180,000 miles per second, roughly, more or less. And ten times the twenty-fifth power times that speed should be a practical capability of speed in space," the former NASA astronaut stated. Cooper went on to declare his belief in lost technological civilizations ("I'm not sure that this civilization we have now is necessarily the most advanced civilization we've had on this world"), and in the story that the U.S. government has in its possession a crashed flying saucer as well as the bodies of the

creatures that flew it. (Griffin: "Is that a credible story?" Cooper: "I think it's fairly credible.") What does Cooper do, now that he is no longer with NASA? He is currently employed, appropriately enough, by Walt Disney Enterprises.

* * * * *

Dean Goodman of Los Angeles was killed when his car plunged off a canyon road. His remains were not found for nineteen days. His German shepherd was with him; the dog was still alive when the man's body was found. Goodman's mother assumed that it was the dog, Prince, who had partially eaten the dead man's body, and she was determined to have the dog destroyed. But this gross injustice was narrowly averted when North Hollywood psychic Beatrice Lydecker interviewed the dog and found that Prince had in fact been wrongfully accused. "I have this ESP with animals," Mrs. Lydecker explained. "Prince had been traumatized by the accident. All Prince could talk about was his dead master." Coyotes and wild dogs, the German shepherd said, had eaten the body, despite Prince's valiant efforts to drive them off. The canine hero's life was spared, owing to this timely information. A local police sergeant observed, "She says she got the information from the dog—and I've no evidence to dispute that."

* * * * *

UPI, July 7, 1978: "Roxboro, N.C.—A man who claimed his sister practiced voodoo was acquitted of an assault charge Thursday when he told the court he punched her in the eye because she raised welts on his neck and blistered his lips with a magic potion." George Bumpass, the accused, told the court, "She can kill a person if she wants to. She can do anything she wants to using witchcraft." Bumpass admitted striking his sister, but pleaded that he acted in self-defense because she was harming him by slapping a magic potion on his face and neck. The judge made no comment other than to declare the accused "not guilty." ●

Is Parapsychology a Science?

Paul Kurtz

I.

An observer of the current scene cannot help but be struck by the emergence of a bizarre new "paranormal world-view." How widely held this view is, whether it has penetrated science proper or is simply part of the popular passing fancy, is difficult to ascertain.

Many of those who are attracted to a paranormal universe express an antiscientific, even occult, approach. Others insist that their hypotheses have been "confirmed in the scientific laboratory." All seem to agree that existing scientific systems of thought do not allow for the paranormal and that these systems must be supplemented or overturned. The chief obstacle to the acceptance of paranormal truths is usually said to be skeptical scientists who dogmatically resist unconventional explanations. The "scientific establishment," we are told, is afraid to allow free inquiry because it would threaten its own position and bias. New Galileos are waiting in the wings, but again they are being suppressed by the establishment and labeled "pseudoscientific." Yet it is said that by rejecting the paranormal we are resisting a new paradigm of the universe (à la Thomas Kuhn) that will prevail in the future.

Unfortunately, the meaning of the term *paranormal* is often unclear. Literally, it refers to that which is "besides" or "beyond" the normal range of data or experience. Sometimes "the paranormal" is

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used as an equivalent of "the bizarre," "the mysterious," or "the unexpected." Some use it to refer to phenomena that have no known natural causes and that transcend normal experience and logic. The term here has been used synonymously with "the supernormal," "the supernatural," or "the miraculous." These definitions, of course, leave little room for science. They mark a limit to our knowing. Granted there are many areas at the present time that are unknown; yet one cannot on a priori grounds, antecedent to inquiry, seek to define the parameters of investigation by maintaining that something is irreducibly unknowable or inexplicable in any conceivable scientific terms.

Some use the term *paranormal* to refer to that which is "abnormal" or "anomalous," that is, that which happens infrequently or rarely. But there are many accidental or rare events that we wouldn't ordinarily call paranormal—a freak trainwreck, a lightning strike, or a meteor shower.

Some use the term *paranormal* simply to refer to the fact that some phenomena cannot be given a physical or materialistic explanation. In some scientific inquiries, physicalist or reductionist explanations are, indeed, not helpful or directly relevant—as, for example, in many social-science studies, where we are concerned with the function of institutions, or in historical studies, where we may analyze the influence of ideas or values on human affairs. But this surely does not mean that they are "nonnatural," "unnatural," or "paranormal"; for ideas and values have a place in the executive order of nature, as do flowers, stones, and electrons. Although human institutions and cultural systems of beliefs and values may be physical at root, they are not necessarily explainable in function as such. There seem to be levels of organization; at least it is convenient to treat various subject matters in terms of concepts and hypotheses relative to the data at hand. To say this in no way contravenes the physical laws of nature as uncovered in the natural sciences.

The term *paranormal*, however, has also been used in parapsychology, where something seems to contradict some of the most basic assumptions and principles of the physical, biological, or social sciences and a body of expectations based on ordinary life and common sense. C. D. Broad has pointed out a number of principles that parapsychologists would apparently wish to overthrow[1]: (*a*) that future events cannot affect the present *before* they happen (backward causation); (*b*) that a person's mind cannot effect a change in the material world without the intervention of some physical energy or force; (*c*) that a person cannot know the content of another person's mind except by the use of inferences based on experience and drawn from observations of his

speech or behavior; (*d*) that we cannot directly know what happens at distant points in space without some sensory perception or energy of it transmitted to us; (*e*) that discarnate beings do not exist as persons separable from physical bodies. These general principles have been built up from a mass of observations and should not be abandoned unless and until there is an overabundant degree of evidence that would make their rejection less likely than their acceptance—if I may paraphrase David Hume.[2] Nevertheless, those who refer to the "paranormal" believe that they have uncovered a body of empirical facts that call into question precisely those principles. Whether or not they do remains to be seen by the course of future inquiry. These scientific principles are not sacred and may one day need to be modified—but only if the empirical evidence makes it necessary.

Some who use the term *paranormal* refer to a range of anomalous events that are inexplicable in terms of our existing scientific concepts and theories. Of course, there are many events not now understood. For example, we do not know fully the cause of cancer, yet we would hardly call it paranormal. There have been many reports recently of loud explosions off the Atlantic coast that remain unexplained and that some have hinted are "paranormal." (These may be due to methane gas, test flights, or distant sonic booms.) If we were to use the term *paranormal* to refer to that which is inexplicable in terms of current scientific theory, with the addition that it cannot be explained without major revisions of our scientific theory, this would mean that any major advance in science, prior to its acceptance, might be considered to be "paranormal." But then new developments in quantum theory or relativity theory, the DNA breakthrough, or the germ theory of disease would have been paranormally related. But this is absurd. There are many puzzles in science and there is a constant need to revise our theories; each new stage in science waiting to be verified surely cannot be called "paranormal."

In actuality, the term *paranormal* is without clear or precise meaning; its use continues to suggest to many the operation of "hidden," "mysterious," or "occult" forces in the universe. But this, in the last analysis, may only be a substitute for our ignorance of the causes at work. Although I have used the term because others have done so, I think that it ought to be dispensed with as a meaningless concept.

II.

It is clear that science is continually changing and growing. As new facts are discovered, existing concepts and theories must either be extended to account

for them or be abandoned in favor of new and more comprehensive explanations.

In the current context, any number of new fields have recently appeared alongside the established sciences. These begin with a number of alleged anomalous events that proponents say cannot be readily explained in terms of the existing sciences. One may ask, Do these subjects qualify as sciences? One must always be open to the birth of new fields of inquiry. At first a new or proto science may be rejected by the existing body of scientific opinion; but in time, if it can make its case, it may become accepted as genuine. This has been a familiar phenomenon as new branches of inquiry emerge in the natural, social, and behavioral sciences. Unfortunately, not all of the claimants to scientific knowledge are able to withstand critical scrutiny, and many turn out to be pseudo or false sciences.

A classical illustration of this is phrenology, which swept Europe and America in the nineteenth century. It was formulated by F. J. Gall, and developed by his followers J. K. Spurzheim and G. Combe. According to the phrenologist: (1) the brain was the organ of the mind; (2) the mental powers of men could be distinguished and assigned to separate innate faculties; (3) these faculties had their seat in a definite region of the brain surface; (4) the size of each region is the measure to which the faculty forms a constituent element in the character of the individual; (5) the correspondence between the outer surface of the skull and the brain surface beneath it is sufficiently close to permit the scientific observer to ascertain the relative sizes of these organs by an examination of the head; and (6) such an examination provided a method by which the disposition and character of the subject could easily be ascertained. The theory was allegedly based on empirical observations from which generalizations were formulated. Gall and his associates examined the heads of their friends, men of genius, and inmates of jails and asylums in order to map the organs of intelligence, murder, sexual passions, theft, and so on. The theory seems quite mistaken to us today—not that behavioral functions may not be correlated in some sense with regions of the brain, but that they could be mapped by examining the exterior skull cap and that the permanent disposition of the persons could be so determined. Yet so great a degree of popularity did phrenology enjoy that in 1832 there were 29 phrenology societies in Great Britain alone, and several phrenology journals in America and Britain—all of which have virtually disappeared.[3] Indeed, I only know of one practicing phrenologist in North America. He tells me he is the leading phrenologist in the world and that he predicts a revival of the field!

The term *pseudoscience* has been used in many ways. One must be careful not to indiscriminately apply it to budding fields of inquiry that may have some merit. Perhaps it should be used for those subjects that clearly: (*a*) do not utilize rigorous experimental methods in their inquiries, (*b*) lack coherent testable conceptual framework, and/or (*c*) assert that they have achieved positive results, though their tests are highly questionable and their generalizations have not been corroborated by impartial observers.

There are a great number of candidates for "pseudoscience" today, many of them ancient specialties that still persist: numerology, palmistry, oneiromancy, moleosophy, aleuromancy, apantomancy, psychometry. And there are new ones constantly appearing. Perhaps some may in time develop testable and tested theories.

Astrology—which had all but died out by 1900 and is now very strong—is a good illustration of a pseudoscience. The principles of astrology remain largely unchanged from the days of Ptolemy (first century A.D.), who codified the ancient craft. And astrologers still cast their horoscopes and do their analyses very much as Ptolemy did, in spite of the fact that its original premises have been contradicted by modern post-Newtonian physics and astronomy. Most astrologers have considered astrology to be an occult field of paranormal study; others have attempted to develop it as a science. Yet astrology does not use rigorous experimental standards of inquiry by which it can reach conclusions, it lacks a coherent theory of what is happening and why, and it draws inferences and makes predictions that are highly dubious. Michel Gauquelin is a critic of traditional astrology on these grounds, though he has attempted to develop his own field of astrobiology. Based on careful statistical analysis, he has attempted to correlate personality characteristics with planetary configurations. Thus, for example, he maintains that there is a relationship between the position of Mars and the time and place of birth of sports champions. Thus far, the results of his study, in my judgment, are inconclusive, though his procedure is far different from the usual approach of astrologers.

Biorhythms appears to be another false science. It also claims to have its foundations in empirical data; yet when independent examination is made to see whether its predictions are accurate, the results appear to be negative.

III.

What are we to say about parapsychology? Is it a science or a pseudo-

science?

Interest in psychic phenomena appears throughout human history, with reports abounding from ancient times to the present. There is a fund of anecdotal material—premonitions that seem to come true, apparent telepathic communication between friends or relatives, reports of encounter with discarnate persons, and so on—that leads many people to believe that there is some basis in fact for psi phenomena. It has been almost a century since the Society for Psychical Research was founded in 1882 in England by a distinguished group of psychologists and philosophers (including William James and Henry Sidgwick) who were hopeful of the chance of getting results from their careful inquiries. In October 1909, William James, a president of the Society, wrote "The Last Report: Final Impressions of a Psychical Researcher," summarizing his experiences.[4] The Society, he said, was founded with the expectation that if the material of "psychic" research were treated rigorously and experimentally then objective truths would be elicited. James reported:

> . . . Like all founders, Sidgwick hoped for a certain promptitude of results; and I heard him say, the year before his death, that if anyone had told him at the outset that after twenty years he would be in the same identical state of doubt and balance that he started with, he would have deemed the prophecy incredible.

Yet James relates that his experiences had been similar to Sidgwick's:

> For twenty-five years I have been in touch with the literature of psychical research, and have had acquaintance with numerous "researchers." I have also spent a good many hours (though far fewer than I ought to have spent) in witnessing (or trying to witness) phenomena. Yet I am theoretically no "further" than I was at the beginning; and I confess that at times I have been tempted to believe that the Creator had eternally intended this department of nature to remain *baffling*, to prompt our curiosities and hopes and suspicions all in equal measure, so that, although ghosts and clairvoyances, and raps and messages from spirits, are always seeming to exist and can never be fully explained away, they also can never be susceptible of full corroboration.
>
> The peculiarity of the case is just that there are so many sources of possible deception in most of the observations that the whole lot of them *may* be worthless . . . Science meanwhile needs something more than bare possibilities to build upon; so your genuinely scientific inquirer . . . has to remain unsatisfied. . . . So my deeper belief is that we psychical researchers

> have been too precipitate with our hopes, and that we must expect to mark progress not by quarter-centuries, but by half-centuries or whole centuries.

Almost three-quarters of a century have elapsed since James's comments. Has any more progress been made? Since that time psychic research has given way to parapsychology, especially under the leadership of J. B. Rhine and the establishment of his experimental laboratory. Where there were before only a handful of researchers, now there are many more. We may ask, Where does parapsychology stand today? I must confess that for many researchers, both within and outside the field, not much further along than before.

One thing is clear: many researchers today at least attempt to apply experimental methods of investigation. This was not always the case; and the field today, as then, has been full of deception, conscious or unconscious—perhaps more than most fields of inquiry. There are a host of fraudulent psychics and researchers—including the Fox sisters (who were hailed as mediums, in whose presence raps were heard during seances, but who evidently admitted they had learned how to crack their toe knuckles), Blackburn and Smith (who deceived scientists into believing that telepathic communication occurred between them), Margery Crandon and Eustasia Palladino (both shown to be fraudulent mediums), the Soal-Goldney experiments on precognition (experiments now in disrepute), Walter J. Levy (who was exposed for faking the evidence on animal ESP at Durham n 1974), Uri Geller, Jean Girard, and Ted Serios (whose alleged abilities in psychokinesis and psychic photography are open to charges of trickery). Even some of the most sophisticated scientists have been taken in by illusionists posing as psychics. In spite of this there *are* many parapsychologists today who are committed to careful scientific inquiry—as Rhine's work illustrates—and the use of rigorous laboratory methods. Whether they ever achieve it is not always clear, and critics are constantly finding loopholes in their methodology.

What about the results? Are the hypotheses proposed by parapsychology testable? Have they been tested? Here there are also wide areas for dispute. Skeptics are especially unimpressed by the findings and believe that parapsychology has not adequately verified its claims—even though some parapsychologists believe that ESP, precognition, and PK have been demonstrated and need no further proof. I reiterate that, since the chief claims of parapsychology in these areas contravene the basic principles of both science and ordinary experience, it is not enough to

point to a body of data that has been assembled over the years; the data must be *substantial.* This does not deny that there seems to be some evidence that certain individuals in some experiments are able to make correct guesses at above-chance expectations. The basic problem, however, is the *lack of replicability* by other experimenters. Apparently, some experimenters—a relative few—are able to get similar results, but most are unable to do so. The subject matter is elusive. It is rare for a skeptic to be able to replicate results, but it is even relatively rare for a *believer* in psi to get positive results. The problem of replicability has been dismissed by some parapsychologists who maintain that their findings *have* been replicated. But have they? For the point is that we cannot predict *when* or *under what conditions* above-chance calls will be made (with Zener cards, in precognitive dream labs, in remote-viewing testing situations); and one is much more likely to get negative results.

One explanation offered by parapsychologists for the difficulty in replication refers to the well-known "sheep/goat" distinction of Gertrude Schmeidler—that is, that those with a positive attitude toward psi (sheep) will get better results than those with a negative attitude (goats). Similar considerations are said to apply to the attitude of the experimenter. Is the explanation for this that when the experimenter is a believer he is often so committed to the reality of psi that he tends to weaken experimental controls? If so, perhaps we should distinguish between the donkey and the fox. The skeptic is accused of being so stringent that he dampens the enthusiasm of the subject. Yet parapsychologists Adrian Parker and John Beloff report on experiments at the University of Edinburgh by pro-psi experimenters that consistently score negative results. Most parapsychologists want positive results, but few receive them. Many or most people don't display ESP; or if they do, they do so infrequently. And those few that allegedly have the ability eventually seem to lose it.

According to John Beloff:

> There is still no repeatable experiment on the basis of which any competent investigator can verify a given phenomenon for himself.[5]

> The Rhine revolution . . . proved abortive. Rhine succeeded in giving parapsychology everything it needed to become an accredited science except the essential: the know-how to produce results where required.[6]

Adrian Parker writes:

> The present crisis in parapsychology is that there appear to be few if any findings which are independent of the experimenter . . . It still remains to be explained why, if the experiment can be determined by experimenter psi, only a few experiments are blessed with success. Most experimenters want positive results, but few obtain them.[7]

Charles Tart says:

> One of the major problems in attempting to study and understand paranormal (psi) phenomena is simply that the phenomena don't work strongly or reliably. The average subject seldom shows any individually significant evidence of psi in laboratory experiments, and even gifted subjects, while occasionally able to demonstrate important amounts of psi in the laboratory, are still very erratic and unpredictable in their performance.[8]

And Rhine himself says:

> Psi is an incredibly elusive function! This is not merely to say that ESP and PK have been hard phenomena to demonstrate, the hardest perhaps that science has ever encountered . . . Psi has remained an unknown quantity so long . . . because of a definite characteristic of elusiveness inherent in its psychological nature . . . A number of those who have conducted ESP or PK experiments have reported that they found no evidence of psi capacity . . . Then, too, experimenters who were once successful may even then lose their gift. . . . All of the highscoring subjects who have kept on very long have declined . . .[9]

All of this means not only that parapsychology deals with anomalous events but that it may indeed be a uniquely anomalous science, for findings depend upon who the experimenter is. But even that is not reliable and cannot be depended upon. If any other science had the same contingent results, we would rule it out of court. For example, a chemist or biologist could not very well claim that he could get results in the laboratory because he believed in his findings, whereas his skeptical colleagues could not because they lacked this belief. We say in science that we search for conditional lawlike statements: namely, that if *a*, then *b*; whenever *a* is present, *b* will most likely occur. Yet in viewing the findings of parapsychology, the situation seems to be that we are not even certain that *b* occurs (there is a dispute about the reliability of the experiments). Moreover, we don't know what *a* is, or if it is present that *b* would occur; *b* may occur sometimes, but only infrequently. A high degree of replicability is essential to the further development of parapsychology. Some sciences may be exempt from the replicability criterion, but this is the case only if their findings do not contradict the general

conceptual framework of scientific knowledge, which parapsychology seems to do. According to the parapsychologist, for example, ESP seems to be independent of space and does not weaken with distance; precognition presupposes backward causation; psychokinesis violates the conservation-of-energy law.

It is not enough for parapsychologists to tell the skeptic that *he*, the parapsychologist, on occasion has replicated the results. This would be like the American Tobacco Institute insisting that, based on its experiments, cigarette-smoking does not cause cancer. The neutral scientist needs to be able to replicate results in his own laboratory. Esoteric, private road-to-truth claims need to be rejected in science, and there needs to be an intersubjective basis for validation. Until any scientist under similar conditions can get the same results, then we must indeed be skeptical. Viewing what some parapsychologists have considered to be replication often raises all sorts of doubts. In the 1930s S. G. Soal attempted to replicate the findings of Dr. Rhine in Britain in regard to clairvoyance and telepathy. He tested 160 subjects, always with negative results, indeed with results far below mean chance expectations. After the tests were completed, he reviewed the data and thought he had found a displacement effect in two cases, which he considered evidence for precognition (that is, above-chance runs in regard to one or two cards before and after the target). Soal then went on to test these two subjects, Basil Shackleton and Mrs. Gloria Stewart, with what seemed to be amazing results. These results have often been cited in the parapsychological literature as providing strong proof for the existence of ESP. In 1941, in collaboration with the Society for Psychical Research, Soal designed an experiment with Shackleton that included 40 sittings over a two-year period. Among the people who participated were C. D. Broad, professor of philosophy at Cambridge, H. H. Price, of Oxford, C. A. Mace, C. E. M. Joad, and others. Broad described the experiment as follows:

> . . . Dr. Soal's results are outstanding. The precautions taken to prevent deliberate fraud or the unwitting conveyance of information by normal means . . . [are] seen to be absolutely water-tight.[10]

> . . . There can be no doubt that the events described happened and were correctly reported; that the odds against chance-coincidence piled up to billions to one . . .[11]

On the basis of his work in precognitive research, Soal was awarded

a doctorate of science degree from the University of London. Even Rhine described the Soal-Goldney experiment as "one of the most outstanding researches yet made in the field . . . Soal's work was a milestone in ESP research."[12]

C. E. M. Hansel, in his work, found, on the contrary, that the Soal-Goldney experiments were full of holes, and he suggested the high results might be due to collusion between the experimenters and/or the participants, especially in the scoring procedures.[13] Broad responded to "Hansel and Gretel," denying the possibility of fraud. It now seems clear that Hansel was correct. And even parapsychologists now doubt the authenticity of these famous experiments. In a recent publication of the Society for Psychical Research, Betty Markwick reported that there is substantial evidence that extra digits were inserted into the "random number" sequences prepared by Soal to determine the targets in the Shackleton tests. These insertions coincided with Shackleton's guesses and apparently accounted for the high scores on the record sheets. Interestingly, Soal was present at every session in which the subject recorded high scores. The only exception was when he was absent, at which time the results were null.[14]

Thus the classical tests usually cited as "proof" of ESP often employed improper shuffling and scoring techniques or had other flaws in the protocol. More recent developments in parapsychology have been more hopeful in this regard. Parapsychologists have attempted to tighten up test conditions, to automate the selection of targets, to use random-number generators and ganzfeld procedures, and to design ingenious dream research and remote-viewing experiments.

One might consider the use of random generators in testing situations to be an advance over previous methods, except for the fact that it is still the experimenter who designs and interprets the experiment. Walter J. Levy, who fudged his results, it may be noted, used machines in his testing work. No wonder the critic is still skeptical of some recent claims made in this area. Great results have been heralded in ESP dream research. Yet here, too, there are many examples of failed replication. For example, David Foulkes, R. E. L. Masters, and Jean Houston attempted to repeat the results obtained at the Maimonides laboratory with Robert van Castle, a high-scoring subject, but they met with no success at all. Charles Honorton has reported what he considers to be impressive results using ganzfeld techniques (where subjects are deprived of sensory stimulation). To date there have been upward of 25 published studies.

Approximately a third have been significant, a third ambiguous, and a third nonsignificant. This may sound convincing. But given the sad experience in the past with other alleged breakthroughs, we should be cautious until we can replicate results ourselves. Moreover, we do not know how many negative results go unreported. (I should say that I have never had positive results in any testing of my students over the years.) Parker, Miller, and Beloff in 1976 used the ganzfeld method to test the relation of altered states of consciousness and ESP and reported nonsignificant results:

> A total of over 30 independent tests were conducted on the data without a single significance emerging. Whatever way we look at the results, they not only detract from the reliability of the ganzfeld, but also argue against the view that psychological conditions are the sole mediating variable of the experimenter effect.[15]

Similarly, Targ and Puthoff at the Stanford Research Institute, in widely reported remote-viewing experiments, have allegedly achieved results that have been replicated. But the critic has many unanswered questions about the method of target selection and the procedures for grading "hits." Given their shockingly sloppy work with Uri Geller, Ingo Swann, and other "super-psychics" in the laboratory, the skeptic cannot help but be unconvinced about their claimed results.

IV.

The accounts above have been introduced as a general comment on the field of parapsychological research: If parapsychology is to progress, then it will need to answer the concerns of its critics about the reliability of the evidence and the replicability of the results.

But difficulties become even more pronounced when we examine other kinds of inquiries that go on in this field; for the parapsychological literature contains the most incredibly naive research reports along with the most sophisticated. A perusal of the parapsychological literature reveals the following topics: clairvoyance, telepathy, precognition, psychokinesis, levitation, poltergeists, materialization, dematerialization, psychic healing, psychometry, psychic surgery, psychic photography, aura readings, out-of-body experiences, reincarnation, retrocognition, tape recordings of the voices of the dead, hauntings, apparitions, life after life, regression to an earlier age, and so on.

We now face a puzzling situation. There has been a marked proliferation of claims of the paranormal in recent years, many of them highly fanciful. Presumably, scientific researchers should not be held responsible for the dramatization of results by fiction writers. Yet in my view some parapsychologists have aided, whether consciously or unconsciously, the breakdown in critical judgment about the paranormal. I have not seen many parapsychologists attempt to discourage hasty generalizations based on their work. There are often extraordinary claims made about psychic phenomena, yet there are no easily determinable objective standards for testing them. Because parapsychologists are interested in a topic and do some research, it is said by some that, ipso facto, it is validated by science. (Lest one think that I am exaggerating, one should consult the *Handbook of Parapsychology*, the most recent comprehensive compilation in the field, which includes discussions of psychic photography, psychic healing, reincarnation, discarnate survival, and poltergeists, among other topics.) Professor Ian Stevenson, for example, of the University of Virginia, is well known for his work in reincarnation, which is of growing interest to many parapsychologists. After discussing the case of a young child who his parents think is a reincarnation of someone who had recently died, Stevenson says:

> Before 1960, few parapsychologists would have been willing to consider reincarnation as a serious interpretation of cases of this type [recall] . . . Today probably most parapsychologists would agree that reincarnation is at least entitled to inclusion in any list of possible interpretations of the cases, but [he added] not many would believe it the most probable interpretation.[16]

Rhine is himself much more cautious in his judgment and implies that only clairvoyance, precognition, and psychokinesis have been established and that adequate test designs have not been worked out for other areas. If one asks if parapsychology is a genuine science or a pseudoscience, it is important that we know if one is referring to the overall field or to particular areas. Surely the critic is disturbed at the ready willingness to leap to "occult" explanations in the name of science in some kinds of inquiry.

Although I have no doubts that Rhine is committed to an objective experimental methodology, I have substantive doubts about his views on clairvoyance, precognition, and PK. The problem here is that one may question not simply the reliability and significance of the data but the

conceptual framework itself. Rhine and others have performed tests in which they maintain that they have achieved above-chance runs. What are we to conclude at this point in history? Simply *that* and no more. ESP is not a proven fact, only a theory used to explain above-chance runs encountered in the laboratory. Here I submit that the most we can do is simply fall back on an operational definition: ESP is itself an elusive entity; it has no identifiable meaning beyond an operational interpretation. Some researchers prefer the more neutral term *psi*, but this still suggests a psychic reality. Of special concern here is the concept that is often referred to in trying to explain the fact that some subjects have significant below-chance runs—"negative ESP," or "psi-missing"—as if in some way there is a mysterious entity or faculty responsible for both above-chance and below-chance guessing. All this seems to me to beg the question. If ESP is some special function of the mind, then we need *independent* verification that it exists, that is, replicable predictions.

One of the problems with ESP is that parapsychologists have noted a "decline" effect; namely, that even gifted subjects in time lose their alleged "ESP" ability. At this point, I must confess that I am unable to explain why there are significant above-chance or below-chance runs: to maintain that these are due to psi, present or absent, is precisely what is at issue. A problem for me is how many validated cases we actually have of significant below-chance runs in the laboratory. Rhine mentions some. But are they as numerous as above-chance runs? If so, perhaps the overall statistical frequencies begin to reduce, particularly if parapsychologists stop testing those who have shown psychic ability once they lose their alleged powers. We still need to come up with possible alternative explanations. Some that have been suggested are bias, poor experimental design, fraud, and chance. There may be others.

Rhine's reluctance to accept telepathy because of the difficulty in establishing test conditions is surprising to some. Of all the alleged psi abilities, this seems prima facie to be the most likely. Ordinary experience seems to suggest spontaneous telepathy, especially between persons who know each other very well or live together. If telepathy is ever established, I would want to find the mechanism for it—perhaps some form of energy transmission, though most parapsychologists reject this suggestion, possibly because they are already committed to a mentalistic interpretation of the phenomenon.

There are, as Rhine notes, very serious scientific objections to precognition—the notion that the future can be known beforehand

(without reference to normal experience, inference, or imagination). The skeptical scientist believes that, where premonitions come true, coincidence is most likely the explanation. If one examines the number of times that premonitions do not come true, the statistics would flatten out. The conceptual difficulty with precognition is that, although we allegedly can know the future by precognition, we can also intervene so that it may not occur.

Louisa Rhine cites the following case to illustrate this:

> It concerns a mother who dreamed that two hours later a violent storm would loosen a heavy chandelier to fall directly on her baby's head lying in a crib below it; in the dream she saw her baby killed dead. She awoke her husband who said it was a silly dream and that she should go back to sleep as she then did. The weather was so calm the dream did appear ridiculous and she could have gone back to sleep. But she did not. She went and brought the baby back to her own bed. Two hours later just at the time she specified, a storm caused the heavy light fixture to fall right on where the baby's head had been—but the baby was not there to be killed by it.[17]

If the future is veridically precognized, how could one act to change it? There are profound logical difficulties with this concept. Some parapsychologists discuss a possible alternative explanation for the event: one parapsychologist suggests (without himself accepting it) that the dream itself might have contained enormous energy that forced the calm weather to change into a storm, which cracked the ceiling holding the light fixture. "This alternative, then, is not precognitive but of the mind-over-matter, or PK variety."[18]

This illustrates a basic problem endemic to parapsychology. The lack of a clearly worked out conceptual framework. Without such a causal theory, the parapsychologists can slip from one ad hoc explanation to another. In some cases we cannot say that telepathy is operating, it may be clairvoyance; and in others, if it is not precognition, then psychokinesis may be the culprit. (Even an ESP shuffle may be at work!) I fear that the central hypothesis of parapsychology, that mind is separable from body and that the "ghost in the machine" can act in uncanny ways, often makes it difficult to determine precisely what, if anything, is happening.

A number of familiar conceptual problems also concern psychokinesis. What would happen to the conservation-of-energy principle if PK were a fact? How can a mental entity cause a physical change in the

state of matter? Comparing the alleged evidence for PK with the need to overthrow a basic, well-documented principle of physics is questionable. We read about Rhine's above-chance results in his die-rolling test: the results seem inconclusive. Recently a number of super-psychics, such as Uri Geller and Jean Girard, have made extraordinary claims for PK ability. Unfortunately, they have been uncritically welcomed by some parapsychologists and paraphysicists. Yet such super-psychics have been discredited, and what seems to be operating is probably magic and illusion, not psi.

Rhine at times expresses an underlying religious motive:

> What parapsychology has found out about man most directly affects religion. By supporting on the basis of experiment the psychocentric concept of personality which the religions have taken for granted, parapsychology has already demonstrated its importance for the field of religion . . . If there were no ESP and PK capacities in human beings it would be hard to conceive of the possibility of survival and certainly its discovery would be impossible . . . The only kind of perception that would be possible in a discarnate state would be extrasensory, and psychokinesis would be the only method of influencing any part of the physical universe . . . Telepathy would seem to be the only means of intercommunication discarnate personalities would have.[19]

Unfortunately, many parapsychologists appear to be committed to belief in psi on the basis of a metaphysical or spiritualist world-view that they wish to vindicate. Charles Tart, a former president of the American Parapsychological Association, admits this motive. Giving an autobiographical account of why he became interested in parapsychology, he says:

> I found it hard to believe that science could have *totally* ignored the spiritual dimensions of human existence . . . Parapsychology validated the existence of basic phenomena that could partially account for, and fit in with, some of the spiritual views of the universe.[20]

Of course, parapsychologists will accuse the skeptic of being biased in favor of a materialist or physicalist viewpoint and claim that this inhibits him from looking at the evidence for psi or accepting its revolutionary implications. Unfortunately, this has all too often been the case; for some skeptics have been unwilling to look at the evidence. This is indefensible. A priori negativism is as open to criticism as a priori wish-fulfillment. On the other hand, some constructive skepticism is essential

in science. All that a constructive skeptic asks of the parapsychologist is genuine confirmation of his findings and theories, no more and no less.

I should make it clear that I am not denying the possible existence of psi phenomena, remote viewing, precognition, or PK. I am merely saying that, since these claims contravene a substantial body of existing scientific knowledge, in order for us to modify our basic principles—and we must be prepared to do so—the evidence must be *extremely strong*. But that it *is*, remains highly questionable.

In the last analysis, the only resolution of the impasse between parapsychologists and their critics will come from the *evidence* itself. I submit that parapsychologists urgently need at this juncture to bring their claims to the most hard-headed group of skeptics they can find. In a recent review, C. P. Snow forcefully argues for this strategy. He admits that there are a good many natural phenomena that we don't begin to understand and ought to investigate. Moreover, phenomena exist that are not explained by natural science but which do not contradict it. It is when such phenomena allegedly do so that we should take a hard look. Snow says:

> An abnormal number of all reported paranormal phenomena appear to have happened to holy idiots, fools, or crooks. I say this brutally, for a precise reason. We ought to consider how a sensible and intelligent man would actually behave if he believed that he possessed genuine paranormal powers. He would realize that the matter was one of transcendental significance. He would want to establish his powers before persons whose opinions would be trusted by the intellectual world. If he was certain, for example, that his mind could, without any physical agency, lift a heavy table several feet, or his own body even more feet, or could twist a bar of metal, then he would want to prove this beyond, as they say in court, any reasonable doubt.
>
> What he would not do is set up as a magician or illusionist, and do conjuring tricks. He would desire to prove his case before the most severe enquiry achievable. It might take a long time before he was believed. But men with great powers often take a long time for those powers to be believed. If this man had the powers which I am stipulating, it probably wouldn't take him any longer to be accepted than it did Henry Moore to make his name as sculptor.
>
> Any intelligent man would realize that it was worth all the serious effort in the world. The rewards would be enormous—money would accrue, if he was interested in money, but in fact he would realize that that was trivial besides having the chance to change the thinking of mankind.
>
> It would now be entirely possible for such a man to have his claims

considered with the utmost energy and rigor. For a number of eminent Americans of the highest reputation for integrity and intellectual achievement have set themselves to examine any part of the paranormal campaigns. The group includes first-class philosophers, astronomers, other kinds of scientists and professional illusionists. They are skeptical as they should be. This is too important a matter to leave to people who want to believe. So there they are, the challenge is down. It will be interesting to see if any sensible and intelligent man picks it up.[21]

This, then, is an invitation and a challenge to parapsychologists to bring their findings to the most thoroughgoing skeptics they can locate and have them examine their claims of the paranormal under the most stringent test conditions. If parapsychologists can convince the skeptics, then they will have satisfied an essential criterion of a genuine science: the ability to replicate hypotheses in any and all laboratories and under standard experimental conditions. Until they can do that, their claims will continue to be held suspect by a large body of scientists.

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On falsifiability

. . . With Einstein, [Karl] Popper realized, the situation was quite different [from that of the Marxists, Freudians, or Adlerians]. Einstein's theory about the universe led to making predictions; predictions that, if they did not hold up, would prove his theory wrong. Einstein's gravitational theory, for example, led to a prediction about "shifts" in the position of stars. Careful, experimental observation corroborated these predictions. But it was not the fact that the prediction held up that made Einstein's theory a scientific one. It was the fact that it could have been shown to be false. *The theory was falsifiable.*

What made Einstein's theory scientific—and different from those of Marx, Freud, and Adler—was that it was incompatible with certain possible results of observation. In short, Popper concludes, the criterion of the scientific status of a theory is its falsifiability, or refutability, or testability. . . .

Popper's notion of falsifiability is surprisingly fruitful. Falsifiablity not only allows us to demarcate science from nonscience and to weed out worthwhile theories from false ones, it also explains how scientific knowledge grows. . . . Falsification, Popper argues, is the key to the growth of science.

—From "Popper's Fallibilism," by Henry Perkinson, in ETC., A Review of General Semantics, *35:1 (1978).*

Chariots of the Gullible

William Sims Bainbridge

Erich von Däniken's theory that human civilization is the legacy of ancient visitations by extraterrestrial beings is a leading example of a host of similar notions that have become surprisingly popular in recent years. This article will not add to the chorus of denunciation that answered von Däniken's irresponsible claims (Story 1977; Omohundro 1976; Wilson 1970, 1975; Lunan 1974). Rather, it will begin to answer the important question of why so many people react favorably to the myth of ancient astronauts. The data come from a pair of questionnaire studies completed with the help of 235 university students.

Questionnaire A (N = 114 students): On the first day of the study, the students were shown the film *In Search of Ancient Astronauts*, which presents von Däniken's basic ideas in a clear and vivid manner. The following day, I gave a short lecture presenting the main tenets of *biorhythm theory*, another pseudoscientific doctrine. Then students filled out Questionnaire A, which focused on biorhythms but also included items measuring students' acceptance or rejection of von Däniken's theory.

The findings reported in this article are expressed by three standard measures of statistical association: Pearson's *r*, Kendall's tau, and gamma. Although they are computed with different formulas, they can be interpreted in the same way. The coefficients range from −1.00 through zero to +1.00. A strong *positive* coefficient linking questionnaire statements X and Y indicates that people who agree with X tend to agree with Y also. A strong *negative* coefficient indicates that people who agree with X tend to disagree with Y. Coefficients close to zero indicate that there is no relationship between X and Y.

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Questionnaire B (N = 121 students): Several months later, a similar two-day sequence was carried out. First, students were shown *In Search of Ancient Astronauts* so they would be familiar with von Däniken's ideas. On the second day, students were given Questionnaire B, which is rather long and contains items designed to test a number of theories. After each questionnaire had been completed, I gave a lecture debunking von Däniken, so that students would be informed rather than deceived by the material presented in the studies.

The 235 student volunteers were recruited from two sections of a low-level university course in sociology. Students majoring in the social sciences are overrepresented (about 25 percent of each class); but the course is frequently used as a distribution credit by students who are not even interested in sociology, and a majority of those taking it have not yet declared a college major. Analysis of the data from both questionnaires indicated that students' academic interests and experience did not seem to influence their opinions on von Däniken. For example, an item in Questionnaire A revealed that the theory of ancient astronauts was equally well accepted by those who preferred either the social sciences or the physical sciences (tau = −0.01). While not perfectly representative of our student body, this large group shows great diversity in interests and opinions. A random sample of the general population would have been ideal, of course; but college students are more than merely expedient and inexpensive research subjects. They are also one of the most interesting segments of the American public. A recent national poll (Gallup 1976) found that persons in the 18–24 age group were twice as likely as older citizens to believe in astrology. Once we learn why many students accept occult and pseudoscientific beliefs, we can design efficient research to determine whether the same factors explain belief among nonstudents.

The questionnaires were designed to test the comparative success of four types of theory in explaining acceptance of von Däniken's space-age mythology. Frequently used to explain many different kinds of deviant behavior, these four types are: strain theory, control theory, cultural-deviance theory, and trait theory (Stark 1975). Travis Hirschi has described the first three concisely:

> According to *strain* or motivational theories, legitimate desires that conformity cannot satisfy force a person into deviance. According to *control* or bond theories, a person is free to commit delinquent acts because his ties

> to the conventional order have somehow been broken. According to *cultural-deviance* theories, the deviant conforms to a set of standards not accepted by a larger or more powerful society. (Hirschi 1969:3)

Trait theory holds that persons deviate from conventional standards because of individual characteristics, whether innate or acquired. These traits may be either handicaps that prevent them from behaving like other people or unusual desires and perceptions that compel them to violate norms. There are several variants of each type of theory, and here we will restrict ourselves to a few of those with the greatest relevance and plausibility. It is convenient to discuss the major types in pairs, beginning with *strain* and *control.*

Strain Theory and Control Theory

Strain theory holds that a person will deviate from standards of conventional or correct belief when he suffers from personal unhappiness caused by a failure to satisfy normal desires within the context of an ordinary life. Unhappiness and psychological tension may drive people to seek new alternatives, to accept exotic beliefs, as well as to experiment with novel lines of action (Smelser 1963; Lofland and Stark 1965).

In Table 1 we can see that strain theory apparently fails to explain belief in von Däniken among our students. In this table and in the others based on Questionnaire B, we show the associations (expressed by Kendall's tau) between several questionnaire items and agreement with two logically opposite statements: "Von Däniken's theory of ancient astronauts is probably true" and "Von Däniken's theory of ancient astronauts is probably false." Thirty-four (28 percent) of the 121 students had agreed with the first statement, while 37 (33 percent) agreed with the second. Naturally, people who agree with one of these statements tend to disagree with the other (tau = -0.75, gamma = -0.90). By including both statements in our tables, we provide important confirmation of apparently significant findings. To be at all convincing, a relationship between any questionnaire item and acceptance of von Däniken's theory has to show two statistically significant coefficients of opposite sign, for example, a strong positive correlation with the opinion that von Däniken's theory is true and an approximately equal negative correlation with the opinion that it is false.

The first item in Table 1 is a question frequently used by the Gallup Poll: "On the whole, would you say you are satisfied or dissatisfied with

TABLE 1

Correlations (tau) Between Opinions About
von Däniken and Five Strain Variables

(N = 121 students)

Strain Variable	Von Däniken's Theory Is True	Von Däniken's Theory Is False
Student is "satisfied with the future facing you and your family."	−0.10	0.11
"I am often bothered by the feeling of loneliness."	0.10	−0.07
"I am fairly satisfied with the progress I am making at college."	−0.03	0.05
"I often wonder about the meaning and purpose of life."	0.06	0.00
"I am a basically happy person."	−0.05	0.02

(In most cases, the student was asked to respond to the statement on a five-point agree-disagree scale.)

the future facing you and your family?" There is a slight tendency for satisfied students to reject the idea that von Däniken's theory is true (tau = −0.10) and to accept the idea that it is false (tau = 0.11). However, these coefficients are extremely small. Statistical analysis shows that we really cannot have any confidence in figures this low, and we would have to see numbers near 0.20 before we could be reasonably sure that dissatisfaction was in fact a cause of belief in ancient astronauts. The four other measures of strain or unhappiness show even smaller coefficients.

Although strain theory has proved useful in explaining many kinds of deviant behavior, control theory is often more successful. Control theory holds that persons who are strongly tied to the conventional intellectual establishment will be prevented from accepting unconventional speculations. Conversely, people who are less strongly attached will be free to adopt deviant beliefs. A student who is committed to college, who is deeply involved in his studies, and who has received much instruction in standard studies should be less likely to fall for the pseudoscientific

notions of von Däniken. Enthusiasm for conventional science and a positive attitude toward technological progress should indicate that a person is committed to the standard intellectual establishment against which von Däniken rails with such vehemence and therefore that he will reject such a deviant belief.

Unfortunately for control theory, Tables 2 and 3 show that these apparently reasonable propositions have no power to explain acceptance of von Däniken's theory. Students who were seniors and about to graduate from college were *not* more likely than freshman students to reject the theory. It did not matter whether students had taken courses in astronomy, anthropology, ancient history, social science, or physical science.

TABLE 2

Correlations (tau) Between Opinions About
von Däniken and Eight College (Control) Variables

(N = 121 students)

College Variable	Von Däniken's Theory Is True	Von Däniken's Theory Is False
Year in College (Freshman–Senior)	0.02	0.01
"I have not yet taken any college courses in astronomy."	−0.03	0.09
"I have not yet taken any college courses in anthropology."	−0.04	0.09
"I have not yet taken any college courses in ancient history."	−0.06	0.04
"I have already taken several courses in the social sciences."	−0.06	0.14
"I have already taken several courses in the physical sciences."	0.08	0.03
Number of correct answers on the astronomy quiz.	0.04	0.02
Student agrees "a college education is pretty much a waste of time."	0.02	0.02

Questionnaire B included a simple eight-item true-false astronomy quiz, designed to measure the student's basic knowledge of this subject. Students ignorant of astronomy were not more likely to accept the theory than those who were somewhat knowledgeable. The final item in Table 2 measures the student's personal commitment to college; those who felt college was a waste of time were not the slightest bit more likely to accept the theory.

Similarly, positive attitudes toward science and technology seemed to have no power to inhibit belief. If anything, Table 3 shows a slight tendency for students who hold favorable attitudes toward science and technology to accept the idea of ancient astronauts. But the coefficients are so small that we must conclude there is no significant relationship.

TABLE 3

Correlations (tau) Between Opinions About
von Däniken and Attitudes Toward Science and Technology

(N = 121 students)

Attitude	Von Däniken's Theory Is True	Von Däniken's Theory Is False
"Science has done a lot more good than harm for the world."	0.11	−0.09
"The potential dangers of nuclear energy are outweighed by its potential benefits."	−0.03	0.07
"Machines have thrown too many people out of work."	0.02	0.07
"Technology does more good than harm."	0.07	−0.14
"It would be nice if we would stop building so many factories and go back to nature."	0.04	0.03
"Technology has made life too complicated."	−0.12	0.11

The failure of strain and control theories is not only sociologically interesting but also surprising and shocking. Both theories have shown their worth in explaining other kinds of deviance, such as crime, drug

abuse, and even mental illness (Stark 1975; Faris and Dunham 1939). The failure of control theory is probably most remarkable. Apparently our university does not give students the knowledge to protect them from intellectual fraud. Of course it is rare for a college professor to mention von Däniken. Teachers of anthropology and ancient history never bother to refute the theory that human culture was received from ancient astronauts. Astronomers seldom debunk astrology or discuss UFOs. Psychology textbooks do not contain chapters on ESP or on such exotic spiritual practices as Yoga, Zen, or Transcendental Meditation. Thus, the failure of control theory may simply reflect a failure of higher education.

The failure of control theory may explain the failure of strain theory. If the intellectual establishment fails to define truth and to enforce conformity, then no special motivation is required to explain deviance. If there is no penalty for believing in unsubstantiated speculations, then anyone might do so. Strain theory explains why some people break free from social control. If there is no control, then there is no need to break free.

Cultural-Deviance Theory and Trait Theory

According to cultural-deviance theories, a person will believe von Däniken because he belongs to a subculture, to a group or social network of people who share beliefs and values that favorably dispose them to believe. There are at least four subcultures that might be important influences in causing belief in ancient astronauts: antiscience, the occult, traditional religion, and the youth counterculture. We used Table 3 to show the inadequacy of control theory, but it also shows that belief in von Däniken is not simply a reflection of the antiscience and antitechnology cultural trends that have emerged recently in the United States and Europe.

Table 4 presents data from Questionnaire A showing the associations between belief in von Däniken and belief in five other theories. Students were asked to indicate their opinion of the chance that each theory was true. It is not surprising that believers in ancient astronauts also think "there is intelligent life on other planets." Much more interesting is the fact that they also tend to accept the pseudoscientific biorhythm theory and tend to believe in ESP. These two strong associations support the impression that von Däniken's theory is part of a generalized occult subculture.

TABLE 4

Correlations (Pearson's *r*) Between Acceptance of von Däniken's Theory and Five Other Theories

(N = 114 students)

Acceptance of Other Theories	Von Däniken's Theory Is True
There is intelligent life on other planets.	0.43*
Biorhythm theory is true.	0.38*
Extrasensory perception exists.	0.52*
Miracles actually happened just as the Bible says they did.	0.01
Darwin's theory of evolution is true.	0.01

* Significant beyond the 0.001 level; the others are not significant. (Students were asked to indicate the chance each theory was true on an eleven-point scale, marked from "0%" = no chance that the theory is true, to "100%" = absolute certainty that the theory is true.)

The insignificant correlation ($r = 0.01$) with belief that "miracles actually happened just as the Bible says they did," suggests that the traditional religious culture is unrelated to belief in chariots of the gods. While von Däniken draws on a variety of religious sources in his books, some of the most intense criticism of his work has come from religious writers (Wilson 1970, 1975). Three items in Questionnaire B measured involvement in traditional religious culture: "I definitely believe in God," "God has a very powerful influence on my life," and "Much of the time, suffering comes about because people don't obey God." Added together, these three produced a reliable index of conventional religion. This index showed no relationship with acceptance of von Däniken's theory (tau = -0.01), or with rejection of it (tau = 0.07). The final item in Table 4, the opinion that "Darwin's theory of evolution is true," measures *both* acceptance of modern science and rejection of fundamentalist religion. Persons who believe in biblical miracles tend to reject Darwin's theory ($r = -0.46$). It is clear that neither the culture of modern science nor the culture of traditional religion is related either positively or negatively to acceptance of von Däniken's theory.

Table 5, based on data from Questionnaire B, confirms that the idea of ancient astronauts is part of a generalized occult and pseudoscientific subculture. Very strong associations link it with belief in UFOs, astrology, ESP, and such exotic spiritual practices as Yoga, Zen, and Transcendental Meditation. Only the last item in the table is unrelated. This suggests that believers did not directly learn von Däniken's theory from participation in the subculture. Apparently, the subculture rests on some very basic modes of thought that encourage acceptance of any new belief that fits the pattern.

TABLE 5

Correlations (tau) Between Opinions About
von Däniken and Other Occult and Pseudoscientific Theories

(N = 121 students)

Other Occult Statements	Von Däniken's Theory Is True	Von Däniken's Theory Is False
"UFOs are probably spaceships from other worlds."	0.54	−0.59
"UFOs are probably illusions."	−0.42	0.40
"I myself have had an experience which I thought might be an example of extrasensory perception."	0.30	−0.35
"Extrasensory perception probably exists."	0.39	−0.35
"Some Eastern practices, such as Yoga, Zen, or Transcendental Meditation, are probably of great value."	0.36	−0.23*
"There is much truth in astrology."	0.40	−0.38
"I was not really at all familiar with von Däniken's theory about ancient astronauts until I saw the movie yesterday."	−0.09**	0.11**

* Significant beyond the 0.005 level
** Not significant

(All other coefficients are significant beyond the 0.001 level.)

One explanation frequently given for the contemporary occult revival blames the influence of the youth counterculture that emerged in the mid-1960s (Wuthnow 1976, forthcoming). Table 6 examines the relationship between acceptance of von Däniken's theory and four plausible measures of involvement in this subculture. Contrary to what the hypothesis would lead us to expect, we find that left-wing politics, drug use, severe criticism of the government, and opposition to police surveillance of dissidents show no connection to acceptance of the theory.

TABLE 6

Correlations (tau) Between Opinions About
von Däniken and Youth Counterculture Items

(N = 121 students)

Counterculture Items	Von Däniken's Theory Is True	Von Däniken's Theory Is False
Student is politically left-wing.	0.05	−0.07
"I have experienced being 'high' on drugs at least once, not counting medical uses."	0.02	−0.07
"Our form of government needs a major overhaul."	0.08	−0.02
Disagreement with the idea that "the police should keep their eye on members of revolutionary groups."	−0.10	0.08

Cultural theories are easily integrated with trait theories. A person's behavior may be determined by his characteristics, but those characteristics are often a result of involvement with cultural alternatives. Unfortunately, this means that the task of pulling the two kinds of theory apart is frequently very difficult. Perhaps Tables 4 and 5 indicate nothing about a subculture but reflect the fact that persons with a certain character type are susceptible to deviant ideas.

Table 7 lists six traits and opinions that might indicate underlying characteristics of the person. We see, first of all, that males and females respond equally favorably to the theory of ancient astronauts.

TABLE 7

Correlations (tau) Between Opinions About
von Däniken and Personal Characteristics of Student

(N = 121 students)

Personal Trait or Opinion	Von Däniken's Theory Is True	Von Däniken's Theory Is False
Sex of student is female	−0.01*	0.08*
"It is good to live in a fantasy world every now and then."	0.18	−0.17
Rank of science fiction among five kinds of adventure fiction.	0.19	−0.18
"It is all right for an unmarried couple to have sexual relations."	0.23	−0.20
Student has a low grade-point average (GPA)	0.20	−0.20
Number of "true" responses on true-false astronomy quiz.	0.01*	−0.09*

* Not significant. (All others are significant beyond the 0.01 level.)

There is a weak but statistically significant association between acceptance of the theory and agreement with the statement that "it is good to live in a fantasy world every now and then." One item in Questionnaire B asked students to rank five kinds of adventure fiction, from the one they liked best to the one they liked least. Preference for science fiction correlates weakly with acceptance of the theory. Although we should not rely too heavily on these weak associations, one possible interpretation is that some people accept von Däniken's theory because they characteristically respond favorably to stories of fantasy.

There is a moderate but respectable association between acceptance of the theory and the feeling that "it is all right for an unmarried couple to have sexual relations." To some extent this item reflects involvement in the youth counterculture and estrangement from traditional religious culture. But neither of these cultures relates to acceptance of von Däniken. The item on sexual freedom may therefore reflect an important

character trait as well. The trait might be a readiness to follow feelings and desires rather than be guided by facts and daunted by practical limitations. Such a trait could find expression in acceptance of emotionally stimulating theories as well as in approval of sexual freedom.

Another moderate association links acceptance of the theory with low grade-point average. Because I wanted to protect my students' confidentiality, I did not look up their actual grades at the university but relied on their responses to an item on Questionnaire B. Inaccuracy in student reporting of GPAs may have reduced the apparent magnitude of the association. Grade-point average reflects several factors, most notably intellectual ability and motivation to achieve. Earlier we found that acceptance of the theory was not related to a number of school variables, including responses to the statement that "a college education is pretty much a waste of time." Students who feel this way almost certainly lack motivation to achieve in college. Therefore, it is probable that here GPA is just a weak indicator of intellectual ability. Less intelligent students are more likely to believe in ancient astronauts. Is this trait equivalent to gullibility?

The true-false astronomy quiz in Questionnaire B can be used to test the hypothesis that some students simply accept anything they are told. The quiz consisted of eight statements, four of which were in fact true, and four false. The average score of students was 55 percent correct. Students who are "gullible" might be more likely than others to give "true" responses on the quiz, accepting its statements whether true or false. As Table 7 shows, however, the number of "true" responses was not associated with acceptance of von Däniken's theory. Other tests of this hypothesis, based on measurement of students' tendencies to agree or disagree with several other questionnaire items, and too complex to present in detail here, gave the same negative result.

A very different exploration of "gullibility" was carried out with Questionnaire A that focused on the pseudoscientific biorhythm theory. Like a simplified brand of astrology, biorhythms is an occult means for predicting one's future fortunes. Using the sole empirical input of a person's date of birth, it estimates for any day whether the person will be above or below average in three aspects of his condition: physical, emotional, and intellectual. As explained elsewhere (Bainbridge 1978a), each student was given a personalized copy of Questionnaire A, including on its last page what purported to be his own biorhythms for that day. Although these were in fact fake biorhythms, determined by the flip of a

coin, students accepted them as correct descriptions far more often than would be expected by chance—74.7 percent of the time, rather than the expected 50 percent.

As Table 8 shows, students who believed the biorhythm theory were especially likely to accept the fake statements of their rhythms for that day. Students who accepted von Däniken's theory and students who believe in ESP were also likely to accept the fake rhythms. We might think that the seemingly authoritative movie and my lecture had persuaded impressionable students to believe the theories presented in them. But no movie or lecture had presented the idea of extrasensory perception, and the highest coefficient in the table (0.30) indicates that ESP believers were likely to accept the fake rhythms. Apparently, some enduring characteristic, perhaps a habitual mode of thought, facilitated acceptance of the fake rhythms. It was not simply a matter of some students being more susceptible to authoritative appeals. Whether this characteristic is a true trait of individual gullibility or an inferior style of intellectual response taught by the occult subculture is a question for future research.

TABLE 8

Correlations (Pearson's *r*) Between Acceptance of Fake Biorhythms and Acceptance of Six Theories

(N = 114 students)

Acceptance of Theory	Student Accepts the Fake Biorhythms as Accurate Descriptions of His Own Condition
Biorhythm theory is true.	0.26*
Von Däniken's theory is true.	0.26*
Extrasensory perception exists.	0.30*
There is intelligent life on other planets.	0.16
Miracles actually happened just as the Bible says they did.	0.15
Darwin's theory of evolution is true.	−0.02

* Significant beyond 0.005 level. (All others are not significant.)

Conclusions

We have seen that two popular theories of deviance fail to explain acceptance of von Däniken's theory by the students. *Strain theory* fails because dissatisfied students were not especially likely to accept the theory. *Control theory* fails because acceptance is not related to the number or kinds of college classes the student has taken, nor to the student's evaluation of college, nor to the student's attitudes toward science and technology.

Both *cultural-deviance theory* and *trait theory* seem much more promising, although we cannot yet specify the exact sources of von Däniken's support. The strongest associations linked belief in ancient astronauts to other occult and pseudoscientific beliefs. Weaker but significant correlations suggested that personal habits of thought were also involved. The most obvious conclusion would be that the occult subculture was responsible for poor individual judgment. This interpretation rests on a consideration of the nature of subcultures.

The word *subculture* is used in two very different senses, referring to two conceptually distinct kinds of social phenomena: (1) a cohesive *group of people* sharing opinions, values, and habits not shared by members of the larger society; (2) a coherent *set of ideas* that are not necessarily held by any specific group of people but are spread throughout society and appeal to various individuals. An example of the former would be an ethnic subculture in which people are closely linked by ties of language, tradition, and family structure. The occult subculture is probably an example of the latter. Although cohesive groups frequently emerge within the occult, as a whole the subculture is not tightly organized and recruits people from many different segments of society (Lofland 1966; Evans 1973; Bainbridge 1978b). The occult is a *set of ideas* that share common root qualities. This fact explains the high coefficients in Tables 4 and 5. The subculture is not based in any cohesive *group of people.* Individuals may find the occult attractive for a large number of different reasons. We would expect to find relatively weak associations linking these factors with acceptance of occult beliefs, perhaps considerably weaker than the associations connecting the beliefs into a set. Clearly, the findings reported in this article demonstrate the need for further research to overcome our ignorance of the sources of deviant beliefs.

We are also ignorant of the consequences of belief. Certainly belief in quack medicine can lead to tragedy. The consequences of belief in

nonmedical occult and pseudoscientific theories are less clear. Although acceptance of von Däniken was associated with low grade-point average in this study, students were apparently quite able to complete college without ever being forced to give up favorable attitudes toward the occult. In a recent sociological book on the development of modern space rocketry (Bainbridge 1976), I speculated that popular movements excited by notions of flying saucers or other extraterrestrial fantasies might provide significant financial and political support for real future space projects. Some of the miscellaneous findings from Questionnaire B appear to confirm this conjecture. Students who accepted the theory of ancient astronauts were likely to favor increased expenditures for the space program (tau = 0.24) and tended to feel that the space program will have a big payoff for the average person (tau = 0.23). These students seem ready to take the next logical steps beyond von Däniken's doctrine. They give strong support (tau = 0.35) to the proposition that "we should attempt to communicate with intelligent beings on other planets, perhaps using radio."

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Tunguska Echoes

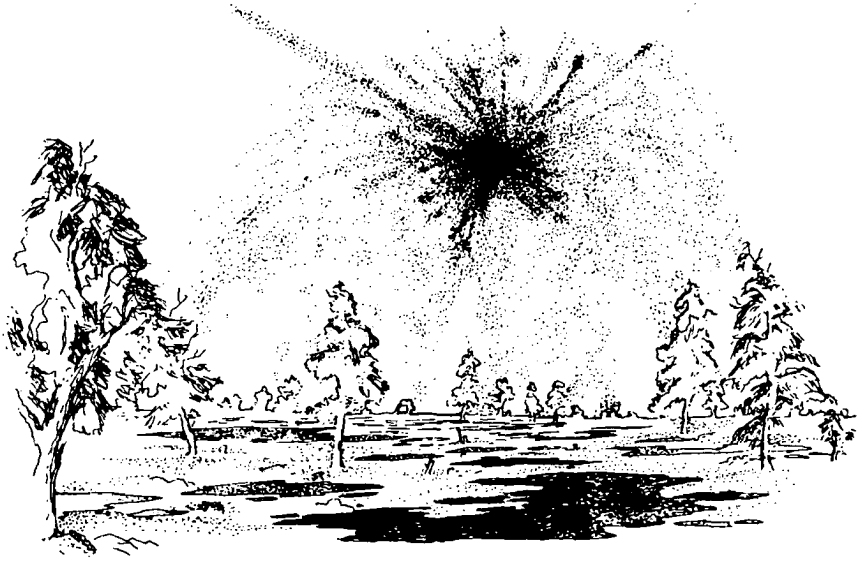
James Oberg

A mighty midair explosion over a remote Siberian swamp is still sending echoes around the world, seven decades after it happened. Near the Tunguska River, in the summer of 1908, an object from outer space was annihilated in a detonation as powerful as a modern hydrogen bomb. If the object was a natural one, it serves as a warning of a repeated disaster over a populated region today; if the object was not natural, it serves as an interplanetary calling card, announcing to those who can recognize and decipher it that an attempt had been made at interplanetary contact.

The "Tunguska Event" remains a puzzle for science, even as it has become a fertile subject for science fiction and UFO speculation. Recently, two TV drama critics, Thomas Atkins and John Baxter, threw together a book called *The Fire Came By* (Doubleday, 1976), condensed in the February 1978 *Reader's Digest*, which insists that the only possible explanation for the event is that it was an exploding nuclear-powered interstellar spaceship. Soviet scientist Aleksey Zolotov makes the world news wires about once a year with a new version of his claim to have discovered radioactivity at the impact site. The flying-saucer subculture has firmly canonized the Tunguska Event as physical proof of UFOs.

Not surprisingly, traditional astronomers reject that interpretation as fanciful and unscientific, as "not required," and as insufficient. The leading standard theory for the 20-megaton (equivalent to 20 million *tons* of TNT) explosion is that it was a comet nucleus that exploded upon hitting the earth's atmosphere.

James Oberg is a computer and space-science specialist working on the space-shuttle project in Houston and a writer on astronomy and space topics.



Explosion of comet nucleus over the Siberian swamps on the Tunguska River, as conceptualized by astronomers in the standard explanation for the 1908 blast.

It is a first-rate scientific puzzle. Its uncertainties and mysteries provide plenty of dark corners in which all manner of far-out theories can safely lurk. And it is an excellent case study in how different schools of thought use and abuse facts.

So let's look at the Tunguska Event the way it is being reported (and exploited) today and the way it is being scientifically researched. Let's examine the media standards that have been used to inform or misinform the public about this puzzle.

At about 7:15 AM local time on June 22, 1908, hundreds of Russian settlers and Tungus natives in the forested hills northwest of Lake Baykal looked up in amazement. A brilliant white light was racing across the sky, casting shadows on the ground, and dazzling the eyes of many who tried to stare at it. Minutes after it passed, a distant rolling thunder came to the ears of the witnesses.

Witnesses 20 to 40 miles from the impact point experienced a sudden thermal blast that could be felt through several layers of clothing. For several seconds, half of the sky lit up like a hundred suns. A few moments after the flash, the shock wave arrived, a crashing boom that broke windows and knocked people off their feet.

The blast was recorded as an earthquake at several weather stations

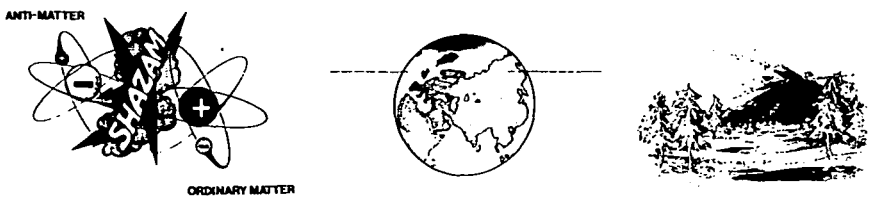
in Siberia, and the atmospheric shock wave bounced barograph needles in weather stations in western Europe. A forest fire was ignited that burned for days over several square miles of pine forest.

At sunset that day, the inhabitants of northern Europe were treated to a celestial spectacle that puzzled them for many years. It did not get dark that night. The night sky glowed with an eerie light, and at midnight it was possible to read a newspaper or to photograph the landscape. American observatories later noted that the atmospheric transparency was degraded for several months.

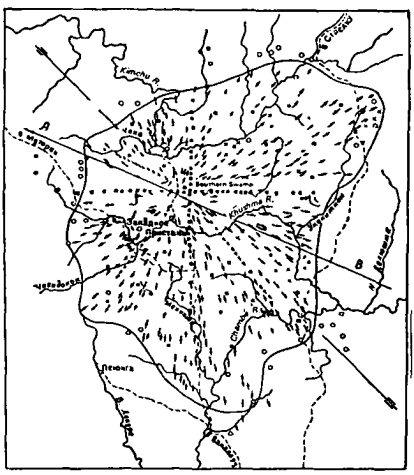
Russia was soon to be plunged into war and revolution, and it took 20 years for the first scientific teams to reach the point of impact of what was thought to have been a giant meteorite fall (the expedition was financed by the promise that tons of meteoric iron would be available for Soviet industry). But no crater could be found. Instead, it was discovered that the trees for miles around had been blasted—from above. Those nearer "ground zero" were still standing but were stripped of their branches and bark. Those further away were smashed down in a direction away from the center.

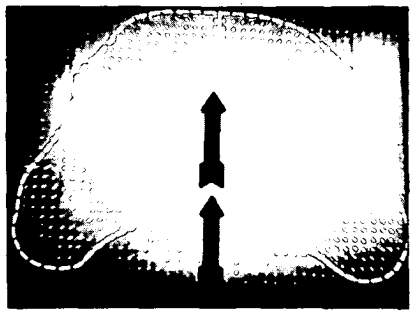
Years later, a Russian science-fiction writer named Kazantsev was struck by the similarity of the blast effects at Tunguska to those at Hiroshima, which he visited in 1945. A year later, he wrote a story in which the blast at Tunguska was represented as the result of an exploding nuclear power plant of a spaceship from Mars, which was seeking fresh water from Lake Baykal. Many fictitious elements of Kazantsev's imaginative story have since become confused with the real features of the Tunguska story.

Two other Russians adopted—and adapted—the story. A Moscow junior-college lecturer in astronomy named Feliks Zigel, taking time out from studying flying saucers and the Abominable Snowman, became a spokesman for the "spaceship theory" of Tunguska. Physics professor



Three more speculative proposals: matter-antimatter collision, mini-black-hole, interstellar space-vehicle explosion.





Actual smashed-tree pattern of the Tunguska Event (map) looks very similar to the "butterfly" pattern simulated in physical tests in Moscow. No extraordinary physical or artificial events need be conjured up to account for the explosion.

Aleksey Zolotov organized several college expeditions to the Tunguska site and made a series of announcements of "abnormal radioactivity," followed by embarrassed retractions.

These reports of radioactivity at the Tunguska site still persist, but they seem to be groundless. Only Zolotov can find them. Other expeditions, initially as dedicated as Zolotov to the spaceship theory, concluded in disappointment that there was no abnormal radiation beyond traces of fallout from secret Soviet H-bomb tests. Nor did the anomalous fast growth of trees, often a sign of radioactive exposure, impress a special team from the Soviet Forestry Ministry. They discovered that the faster growth followed the distribution of forest fires set off by the blast, to the exclusion of regions closer to ground zero (and hypothetical radioactivity) that did not happen to catch fire. Accelerated growth is an established effect of forest fires, and the Soviet scientists concluded that this had been the case at Tunguska.

In the West, carbon-14 expert and Nobel laureate Willard Libby reported on results of measurements of tree rings in Arizona. There was a small rise in the carbon-14 level following 1908, to be sure, but it was matched by other erratic ups and downs over the years and could have been a random jump. Libby calculated the force of the blast at Tunguska and the radiation that would have been released had the blast involved thermonuclear reactions. He concluded that the low levels of carbon-14 he found, even if completely attributable to the blast, could still only account for no more than 15 percent of the whole force of the detonation. Other carbon-14 tests in Norway, meanwhile, showed absolutely no rise

The old story that won't die

Every year the "Tunguska UFO" is reborn when some unsuspecting Western newsman in Moscow, searching for an interesting story, falls into the company of Feliks Zigel or Aleksey Zolotov. Within hours, the world's news wires are humming again with an old story that has more lives than the fabled cat: "Top Russian scientists have proved that an atomic UFO crashed in Siberia in 1908."

As more and more evidence piles up indicating that the Tunguska blast was actually caused by a small comet's impact, the handful of "spaceship buffs" seem to have grown more desperate, but no less effective, in corralling the public's attention. Zolotov, for example, has vowed to let his Tolstoyan beard grow until the world adopts his theories. (Needless to say, no professional Soviet geologists or astronomers think much of such tactics or theories.) Zigel, a longtime devotee of UFOs and the Abominable Snowman (Zolotov's major non-Tunguska specialties are faith healing and body auras), poses as "a respected scientist" and a "cosmonaut instructor," but is, in fact, a lecturer in astronomy at a Moscow junior college.

Zigel's latest publicity tactics are exemplified in an Associated Press story out of Moscow on October 22, 1978, based on an interview Zigel gave Tass. He boasts that the book *The Fire Came By* independently corroborates his *own* theories, when in fact the authors are actually only quoting Zigel's assertions. Nor are the authors "University of Texas scientists," as the story claims: they are TV drama critics currently enjoying the commercial success of their latest dramatization (some would say fictionalization), while refusing to debate the subject with informed specialists.

Once again, there is no evidence that AP made even the slightest effort to verify the sensational claims with reputable scientists in the Soviet Union or America. It's an old familiar pattern, and it will take more power than that of the multimegaton Tunguska blast to sweep it away.

—James Oberg

Soviet Scientist Gives Theory

Siberian Catastrophe Linked to UFO

MOSCOW (AP) — A cataclysmic explosion that scarred a vast area of Siberia 70 years ago and has baffled scientists ever since may have been casued by a flying saucer, says a respected Soviet astronomer.

The explosion, known as the "Tunguska Mystery" devastated a remote forest region in central Siberia June 30, 1908. It leveled trees over a 1,250-square-mile area and was followed by intense radiation and a great fire.

A score of scientific expeditions to the area and dozens of scientific research papers have put forth theories ranging from the crash of a meteorite or comet to the collision of a "black hole" with the Earth. "[illegible] holes," whose existence have not been pro[illegible]dly collapsed stars.

fied flying object which exploded over the forest in 1908 was an extraterrestrial probe," Zigel said Saturday in an interview with the official Soviet news agency Tass.

Zigel based his theory in part on the fact that scientists have determined that the object flew in an "enormous loop," first northward then westward, before crashing — a trajectory that apparently cannot be explained by any natural phenomenon.

He also supports his theory with data showing that the explosion deposited a high quantity of zinc, bromine, sodium, iron, lead and "other elements that are completely atypical of come t nuclei but are quite possibl[illegible] ar[illegible] cial structur[illegible]

Wire-service dispatch distributed Oct. 22, 1978, unquestioningly relates, once again, Zigel's claims of a Tunguska "UFO."

at all following 1908, so these tree-ring experiments are strong evidence that the Tunguska Event did not involve significant nuclear reactions, if any.

But wait a minute! That's not what the modern Tunguska myths tell. Why does the book *UFOs Behind the Iron Curtain*, by Ion Hobana, state explicitly that "Libby is one of the leading proponents of the nuclear theory"? Why does Zolotov still get worldwide attention when he periodically reissues his "discovery" of Tunguska radiation? Why does *The Fire Came By* declare that the thermonuclear nature of the

Egregiously yours:

Haven't seen your fill of imaginative theories to explain the Tunguska Event? Hardly seems likely; but just in case, two American astronomers propose another one. And in doing so, in an amusing article in the September 1978 *Quarterly Journal of the Royal Astronomical Society* (19:282-289), they provide a light-hearted lesson in how easy it is to concoct a theory that—outlandish or not—nevertheless fits the facts.

In the article, entitled "On Egregious Theories—the Tunguska Event," M. Susan Wilkerson, of the Steward Observatory of the University of Arizona and the Sacramento Peak Observatory in Sunspot, New Mexico, and Simon P. Worden, of the Sacramento Peak Observatory, first categorize the existing hypotheses. The prevailing meteoritic and cometary hypotheses they label "unimaginative." "More interesting theories" are the antimatter and black-hole ideas.

Then there are the "crackpot" hypotheses. "One of the oldest and most enduring of the crackpot theories involves the nuclear propulsion system of a UFO either blowing up or being jettisoned over an uninhabited area." These, they say, are examples of the extremes to which people have gone to explain the phenomenon. "No refutation will be presented—they fall on their own merits." They consider the native Tungus tribesmen's theory—that the explosion was a visitation by the fiery god Agdy to punish the wicked—to be more plausible. But Wilkerson and Worden can't resist mentioning their favorite crackpot theory, one "even more imaginative" than the others. Proposed by two Soviet writers in 1964, it suggests that the eruption of the Krakatoa volcano in 1883 sent a large flux of radio waves into space that was interpreted by intelligent beings on a planet around 61 Cygni, 11.2 light-years away, as a message from Earth. The Cygnians answered back with a laser beam but, alas, the beam was far too strong and caused the explosion in the atmosphere above Tunguska, a classic case of poor communication.

Tunguska blast is inescapable and irrefutable? Why indeed?

In *The Fire Came By*, the spaceship theory has reached its zenith. I had the dubious honor of debating one of the authors on radio about a year ago when the book was being serialized nationwide by the *New York Times*. In the considered opinion of many listeners I "made mincemeat of the poor guy." He hadn't done his homework. He hadn't bothered with contrary evidence and didn't know how to begin to answer it (I had to let him off the hook several times myself, lest the "debate" grind to a halt). He was a TV drama critic who had seen a chance for a successful

Lithium Meteor?

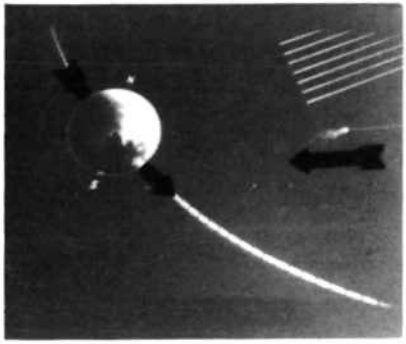
Wilkerson and Worden have their own "explanation" of the event, and they offer it "to demonstrate the ease with which data-consistent, highly implausible hypotheses may be created." Their tactic is reminiscent of Bertrand Russell's strategy in dealing with cranks (brought to my attention by Dennis Rawlins and described in Martin Gardner's *Fads and Fallacies in the Name of Science*, p. 326)—one-up them with your own imaginative theories and interpretations.

Their "hypothesis" is that the explosion was caused by a lithium meteorite. A meteorite composed of up to 10 percent lithium and hitting the atmosphere at 880 kilometers per second would be compressed when it strikes the atmosphere. This could start a nuclear reaction and result in a huge explosion. Perhaps, they speculate, the high-speed fragment came from a lithium-rich planet blown up in its sun's supernova explosion. "A lithium meteor entering the earth's atmosphere and undergoing nuclear reactions would resemble an ordinary atomic-bomb air burst of about 10 megatons, only much elongated," they say. They contend their "lithium meteorite model" can well explain the Tunguska observations.

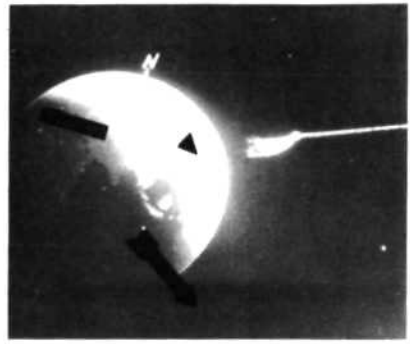
The real point made by Wilkerson and Worden is not the "theory" itself. "We hope we have demonstrated in this paper a phenomenon common in science. Often when there exists no firm, quantitative data, such as with Tunguska, a variety of exotic conjectures are presented. Such results are not difficult to concoct; all that is needed is a fertile mind and a well-stocked spice rack of random physics from which to work. We do not intend to suggest that this is bad; merely that it should be accepted in the vein in which it is appropriate, namely, entertainment."

In their acknowledgments, Wilkerson and Worden give special thanks to "the management of the Western Bar in Cloudcroft, New Mexico, for use of their facilities, which provided inspiration."

—Kendrick Frazier



Approach of comet was from sunward side of the earth, which explains why it was not seen beforehand.



The comet's tail extended "down sun" (westward), which meant impact in Siberia would have resulted in the tail's dust entering the atmosphere over western Europe.

book, given the right slant and a minimum of responsibility. In terms of its commercial success, he guessed right. Despite friendly words exchanged at the end of the radio debate, he never responded to my letters requesting clarification and support of many of the major claims in the book. His point of view is often expressed in the news media. But I remain willing and eager to reopen the Tunguska debate with the authors or with any other proponent of the spaceship theory in order to get all the facts on record.

So, as a theory, the spaceship hypothesis loses out. Now, follow the arguments for the "comet hypothesis," perhaps not as exciting, but probably a lot more important. Tunguska was not an isolated event; it could happen again, and we better get ready for it.

The "glowing night sky" over Europe was the comet's dust in the upper atmosphere, lit by the midnight sun of the famous midsummer "white nights" (which I have seen from Sweden and Leningrad). An astronomer took a spectrogram and showed that the "eerie glow" was pure reflected sunlight. The comet-earth encounter geometry was such that the object came "out of the sun" and was masked in the daytime sky. Besides, it wasn't a very big comet. When it hit, the tail was extending "down sun," toward the west, precisely across Europe.

And cometary or meteoric material often does detonate violently on contact with the atmosphere. This is not a chemical or antimatter reaction—it's just the kinetic energy of the speeding object being converted suddenly to tremendous internal heat. Often, only a few hunks of ice and some fine sooty dust will be all that reaches the ground.

It has happened before and since, at places other than Tunguska. Over western Canada in 1965, a 10-kiloton midair explosion sprinkled meteoric dust over freshly fallen snow, prompting astronomer Ronald Oriti to suggest that the Tunguska Event could have been simply a larger object of the same type. The iconoclastic books of Charles Fort chronicle numerous cases of midair explosions, falling ice, and "black rains." Secret United States barographic nuclear blast monitors have been picking up strange random explosions in the upper atmosphere several times a year, often of kiloton size or larger. Even a moderate-sized comet air blast today might not be recognized, resulting only in a spate of angry phone calls to the nearest Air Force base. It is possible that many of the "earthquakes" of recorded history, which killed tens of thousands and which leveled cities, may actually have been Tunguska-sized blasts over inhabited areas. The old records must be reread with this new perspective.

This underscores the real danger: there are few uninhabited wastelands on earth today, and even the open sea is covered with human traffic. The records of nature suggest that such giant blasts, or larger ones, can be expected again.

The idea of a Tunguska explosion occurring again, as a human tragedy instead of a scientific (and pseudoscientific) curiosity, is not so farfetched. But to defend against such future cosmic bombs it is first necessary to recognize them for what they are. Here the spaceship theory and the distortions, omissions, and fabrications of its proponents (both well-meaning and otherwise) remain a major obstacle, and a major danger.

Ultimately, both radar and optical sensors on earth and in space will watch for incoming objects. Missiles based deep in space, armed with multimegaton warheads, will stand guard. Science fiction has long prepared for this scenario, and fact science is now preparing for that eventuality to come to pass. The fictional science and pseudoscience of the "Tunguska spaceship" should be discredited and dismissed as quickly as possible so that we can get on with defending the earth against future "Tunguska comets." ●

Space Travel in Bronze Age China?

David N. Keightley

Ancient monuments, cave drawings, texts, and legends have been cited by many "UFOlogists" to show that visitors from outer space came to the earth in the predawn of history.[1] The function that the stones, rock-carvings, patterns, or other ancient symbols served for the peoples who made them cannot in many cases now be determined. Any case in which the meaning *can* be determined is worth studying.

According to a story by Arthur Gorlick in the *Chicago Daily News* (April 24, 1974, p. 16),[2] Ralph Blum was to present to the April 1974 meeting of the Society of Ancient Astronauts, assembled in Park Ridge, Illinois, the following evidence (see Figure 1):

> It is a piece of elephant bone carved with ancient Chinese pictographs discovered in the An-yang region of northern China in 1930 and which Blum says dates from around 1300 B.C.
>
> He says the pictograph characters on the carving were translated by Tung Tso Pin, a professor at Hong Kong University, and James J. Hurtak, director of the Academy for Future Science in Los Gatos, California.
>
> Their translation of the characters, Blum says, reads: "A man and woman (1) are shown to be on the third planet (2) from the sun (3). A higher being (4) arrives on the planet by reversing an energy field (5), and flying like a bird (6), displaying qualities of lightning (7). The being can take on the appearance of earthmen (8); can combine the qualities of man and bird (9), and fly like a bird (10). The 'instrument of means' (11) by which he returns to a distant star system (12) is a rocket-propelled (13) vehicle (14)."

David N. Keightley is associate professor of history at the University of California, Berkeley.

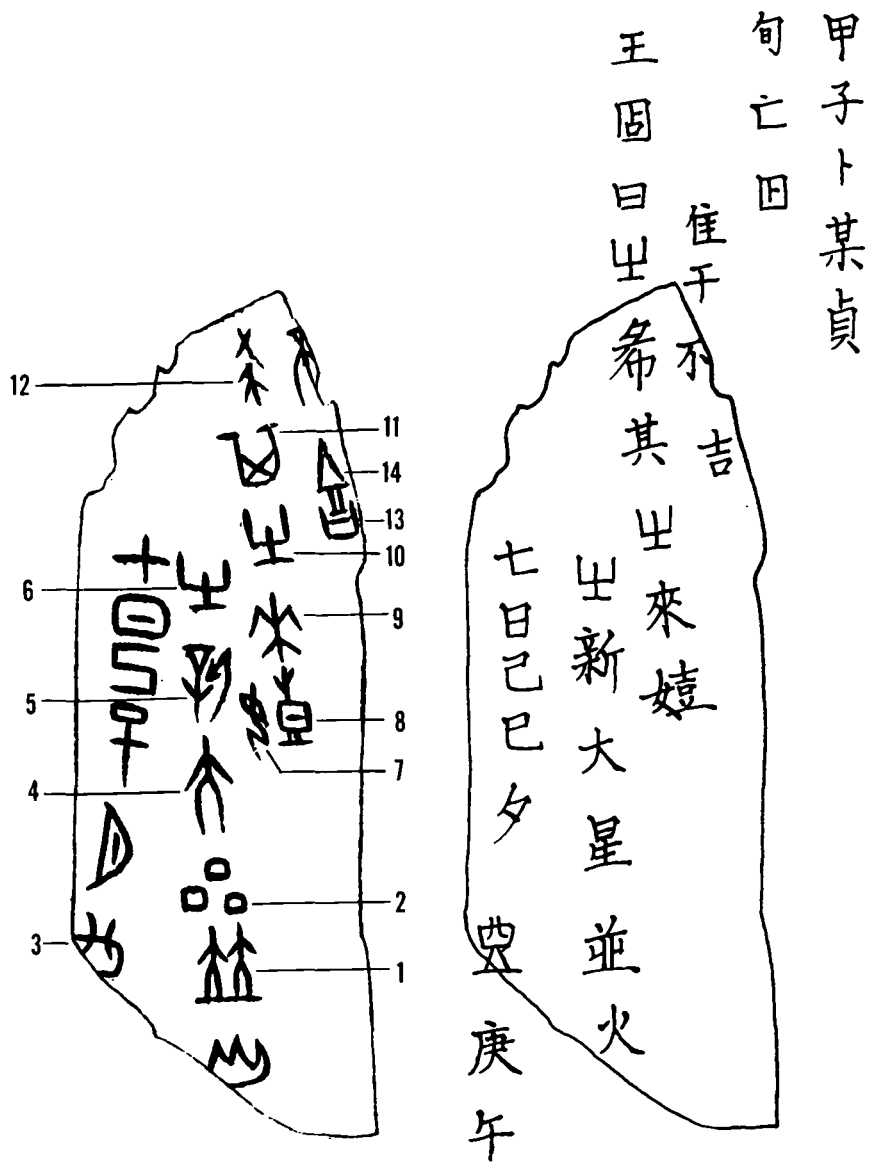


FIGURE 1. *Hou-pien* 2.9.1 as it appeared in the *Chicago Daily News* (left) and in modern transciption with missing graphs supplied (right).

This may be nothing more than a case of inspired press-agentry.[3] The wide circulation that the story received, however, and the superficial plausibility of its methodology and translation, suggest that a brief critical inquiry is not out of place.

To decipher what the inscription says we must first understand that it is a so-called oracle-bone inscription from the reign of the Shang king Wu Ting (ca. 1200-1180 B.C., in my view). Shang divination was carried on as follows: The diviner addressed a "charge" to a turtle-plastron or cattle scapula, the charge being a prediction, statement of intent, or prayer submitted for the approval of the spirits. As he proposed the charge, the diviner applied a glowing brand, or some other heat source, to a series of hollows that had already been bored and chiseled into the back of the shell or bone. The heat caused stress-cracks to form; the diviner then examined the cracks and interpreted them as auspicious to a greater or lesser degree. A record of the date, the diviner's name, charge, and the results if any, was then carved into the bone or shell.[4]

We can now set a few facts straight. First, the inscription is not carved on elephant bone, but on a bovine scapula. Second, the inscription was published in 1916;[5] it cannot have been discovered in 1930. Third, Tung Tso-pin's understanding of this inscription bears no relation whatever to Hurtak and Blum's;[6] it is dishonest to pretend otherwise. Fourth, the translation treats the Chinese graphs not as members of an extensive written language, but as isolated ciphers to which it arbitrarily assigns meanings for which there is no conceivable etymological justification; it even splits common Shang graphs (7 and 8, 13 and 14) in two. Fifth, having assigned fantastic meanings, it then reads the words in reverse order.[7]

To turn from the world of fantasy to the world of scholarship, what does the inscription mean? The school to which Tung subscribed (represented in English by Joseph Needham) regards it as "the most ancient extant record" of a supernova: "On the seventh day of the month, a *chi-ssu* day, a great new star appeared in company with Antares" (i.e., Blums's graphs 5, 4, 2, 1, and the "fire" graph, *huo*, at the bottom).[8] Another school, represented by Hu Hou-hsüan, takes key words to be sacrifice terms and would translate: "On the seventh day of the month, a *chi-ssu* day, we performed *yu* (graph 6) and *hsin* (graph 5) sacrifice (to) the great star, and *ping* (graph 1) sacrifice (to) Huo." Another view, that of Yang Shu-ta, takes *hsing* (graph 2) to refer to "seeing the stars," i.e., to clearing weather, so that the record becomes a favorable weather

report, "there was a new great clearing." And still another school, of which Li Ya-nung is the sole exponent, believes that the inscription records the linking of a new great earthwork to the mountains.[9]

The meaning of the inscription may be determined with comparative certainty if we consider its context and rationale. First of all, the large, bold calligraphy and the formulas involved (especially the phrases, "inauspicious . . . there will be the coming of alarming news . . . the *t'ou*-period dividing the night of *chi-ssu*. . . .") indicate that we are dealing with a standard "ten-day week" charge, prognostication, and verification from Wu Ting's reign. On the basis of parallel inscriptions,[10] we may supply some twelve missing graphs (see figure) and reconstruct and translate as follows:

(Preface:)	[Crack-making on *chia-tzu* (day 1),[11] So-and-so divining:]
(Charge:)	["In the (next) ten days there will be no disasters."]
(Prognostication:)	[The king reading the cracks said: "There will be] harm; there will be the coming of alarming news. [If it be such-and-such a cyclical day] it will be inauspicious. . . ."
(Verification:)	On the seventh day, in the *t'ou*-period dividing the night of *chi-ssu* (day 6) [and keng-wu (day 7)[12]], "there was a new great star standing together with the Fire-star."

It must be appreciated that in the reign of Wu Ting, forecasts of harm could be verified only by unpleasant happenings, such as enemy incursions, toothache, and, significantly for this case, lunar eclipses.[13] In a "display inscription,"[14] such as we have here, the king foretold that something bad would happen; something bad did happen; the king's role as augur was validated. This being so, records of sacrifice, of clearing weather, or of earth-construction, cannot qualify as possible verifications in this case, for they would not have confirmed the king's gloomy prognostication. We may safely take the verification to be a record of an ominous celestial event, much like an eclipse, that confirmed the king's forecast. I do not know if we are justified in identifying, as Needham does, the Fire-star of Shang times with Antares; but since this was the name of the star in Chou and later times, the assumption is plausible.

In conclusion, what was originally a Chinese Bronze Age record of an ominous celestial event became, in the *Chicago Daily News*, an account of space travel. If this is what "UFOlogists" do to messages we can understand, one wonders what trust should be placed in their readings of, for example, Cro-Magnon cave paintings ("a complete catalog of contemporary UFO designs . . . an object remarkably like our lunar Module," etc.[15]) where we can have less check upon their interpretations. Prehistoric and ancient records of space flight may possibly exist, but before they can be accepted as evidence they need, in all cases, to be deciphered first by scholars familiar with the materials, rather than by those who are familiar with UFOs.

Notes

1. The paradigmatic study is Erich von Däniken, *Chariots of the Gods?* (New York: Putnam, 1970), now in its 45th paperback printing. For other examples, see Aimé Michel, "Palaeolithic UFO-shapes," *Flying Saucer Review* 15 (1969), 3-11, and von Däniken's more recent works.

2. I am grateful to Professor Chou Hung-hsiang of UCLA for calling the *Daily News* story to my attention. Ralph and Judy Blum are the authors of *Beyond Earth: Man's Contact with UFO's* (New York: Bantam, 1974).

3. The origin of the newspaper story is unclear. "I am sorry to report that Ralph Blum apparently has no substantiation to support the *Chicago Daily News* article. . . . In fact, when we questioned Mr. Blum about the article, his answer was that he had not seen the Chinese characters before he saw the newspaper article" (letter of 13 August 1974 from Gene M. Phillips, founder of the Ancient Astronaut Society). My letter of inquiry of 15 October 1974 to James Hurtak was neither answered nor returned.

4. For an introduction to these materials, as well as a brief discussion of their date, see David N. Keightley, *Sources of Shang History: The Oracle-Bone Inscriptions of Bronze Age China* (Berkeley, Los Angeles, and London: University of California Press, 1978).

5. Lo Chen-yü, *Yin-hsü shu-ch'i hou-pien* (n.p. 1916; reprint [Taipei], n.d.), pt. 2, p. 9. no. 1.

6. Tung Tso-pin, *Yin-li-p'u* (Nan-ch'i, Szechwan, 1945), pt. 2, ch. 3, pp. 1b-2a.

7. The correct order, following Blum's numbers, would be: 12, 11, 10, 9, 8 . . . 14 . . . 3 . . . 6, 5, 4, 2, 1, and presumably, zero and blast-off!

8. Joseph Needham, with the collaboration of Wang Ling, *Science and Civilization in China*, Vol. 3, *Mathematics and the Sciences of the Heavens and the Earth* (Cambridge, England: Cambridge University Press, 1959), p. 424.

9. For a summary of these theories, and citations to the original scholarship, see Ikeda Suetoshi, *Inkyo sho kei kōhen shakubun kō* (Hiroshima: Hiroshima daigaku bungakubu, 1964), pt. 2, pp. 33-35.

10. See Shima Kunio, *Inkyo bokuji sōrui*, 2d rev. ed. (Tokyo: Kyūko Shoin, 1971), pp. 209.4-210.3, 307.3-308.2, 4Q1.3-402.4; note in particular *Ts'ui-pien* 1136b (Shima, p. 308.1) and *K'u-fang* 1595 (Shima, p. 307.4). (For the full bibliographic citations for the oracle-bone collections to which these and subsequent abbreviations refer, see Keightley, *Sources*, pp. 229-231.)

11. The Shang named their days by combining two sets of symbols, known to later ages as "the heavenly stems and earthly branches"; their regular combination (there were ten stems and twelve branches) produced an unending cycle of sixty day-names.

12. On the *t'ou* period, see Keightley, *Sources*, p. 43, n. 79.

13. For eclipse inscriptions, see *Ping-pien* 57.1; *K'u-fang* 1595 (Shima, p. 307.4); cf. Keightley, *Sources*, p. 174, n. 19.

14. For a definition of this term, see Keightley, *Sources*, p. 46. n. 90.

15. Ralph and Judy Blum, *Beyond Earth*, pp. 39, 41, referring to the article by Michel cited in 1 above. ●

Judging nonscientists' speculations

The Velikovsky affair raises what is perhaps the most disturbing questions about the public impact of science. How is a layman to judge rival claims of supposed experts? Any person with a gift for words can spin a persuasive argument about any subject not in the domain of a reader's personal expertise. Even von Däniken sounds good if you just read Chariots of the Gods. . . .

We know that many fundamental beliefs of modern science arose as heretical speculations advanced by nonprofessionals. Yet history provides a biased filter for our judgment. We sing praises to the unorthodox hero, but for each successful heretic, there are a hundred forgotten men who challenged prevailing notions and lost. Who among you has ever heard of Eimer, Cuenot, Trueman, or Lang—the primary supporters of orthogenesis (directed evolution) against the Darwinian tide? Still, I will continue to root for heresy preached by the nonprofessional. Unfortunately, I don't think that Velikovsky will be among the victors in this hardest of all games to win.

—*Stephen Jay Gould,* Ever Since Darwin, *(New York: Norton, 1977)*

Book Reviews

The Hynek UFO Report. By J. Allen Hynek. Dell Publishing Co., New York, 1977. Paper, $1.95.

Reviewed by Robert Sheaffer

In the wake of the tremendous success of Columbia Pictures' blockbuster *Close Encounters of the Third Kind*, UFOs have become hot commercial property, and there is no name in the realm of UFOs with a higher recognition factor than that of J. Allen Hynek. As the longtime astronomical consultant to the Air Force's Project Blue Book, director of the much-ballyhooed Center for UFO Studies, and "technical advisor" for the film *Close Encounters*, Hynek is clearly light-years ahead of the pack when the media goes looking for a spokesman to represent "serious" UFO research. Thus when a new book comes out under the authorship of this man, who styles himself the "Galileo of UFO Studies," it is bound to attract a lot of notice; and to many people Hynek is the embodiment of what they term the "future science" of UFOlogy.

The book is primarily a condensation and summary of UFO sightings from the Project Blue Book files, as selected by Hynek. Daylight disks, radar UFOs, close encounters of each of the three kinds (it was Hynek, in his first UFO book, who coined that now-immortal phrase)—each category of UFOs is described, followed by selected examples.

In the chapter on radar UFOs, we find "The Radar Case Condon Couldn't Crack"—the Bentwaters-Lakenheath incident of 1956 in England. What Hynek conveniently manages to avoid mentioning is that Philip J. Klass did indeed "crack" the case in his book *UFOs Explained*, devoting an entire chapter to it. Hynek has presumably read *UFOs Explained*, since he reviewed the book for *Fate* magazine. So why does he represent the incident as totally without explanation? In *real* scientific disciplines, it is not considered intellectually honest to discourse at length on a supposed anomaly without even mentioning that another leading researcher, with whom one disagrees, has published a proposed solution for it. But in the "science" of UFOs, such scruples seem not to apply. Hynek makes no attempt to refute Klass.

In the chapter on "close encounters of the second kind," describing UFOs that reportedly cause tangible physical effects, we encounter a case in which a

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UFO reportedly hovered four feet above a field alongside a major intersection during the morning rush hour. It reportedly caused cars to stall. Yet we learn of this extraordinary incident through the testimony of only a single witness. Hynek remarks: "One might wonder why there weren't more witnesses to the event; but as we have already noted, one of the chief characteristics of UFO sightings seems to be their isolation in time and space. This is, of course, a highly puzzling feature . . ." (p. 178). It should likewise be noted that pink elephants, which are sometimes sighted by individuals lying beneath barstools, constitute another phenomenon that is isolated in time and space. Such peculiar behavior is the earmark of fantasy and hallucination, not of some Profound Unknown. Occam's Razor, the cutting edge of scientific decision making ("entities are not to be multiplied beyond necessity"), dictates that when dealing with a phenomenon, one of whose "chief characteristics" is selective visibility, a la hallucination, one must opt for the *simplest* hypothesis: the phenomenon *is*, in large part, hallucination. It is surprising that a man with Hynek's training in astronomy would ignore, and even contradict, such a fundamental scientific concept in formulating a new hypothesis.

In the chapter on nocturnal lights, Hynek makes an assertion that prompted UFO researcher David A. Schroth to point out the following minor inconsistency in Hynek's public statements:

> 1977: "When I was in charge of the United States Optical Satellite Tracking Program during the International Geophysical Year (1957-58), we received many reports from our Moonwatch stations concerning the strange lights that certainly weren't satellites." (p. 78)
>
> 1959: "I can quite safely say that we have no record of ever having received from our Moonwatch teams any reports of sightings of unidentified objects which had any characteristics different from those of an orbiting satellite, a slow meteor, or a supposed plane mistaken for a satellite." (Quoted by Ruppelt, *The Report on Unidentified Flying Objects*, p. 271, revised edition.)

Which of these two Hyneks are we to believe? Other individuals associated with Moonwatch suggest that Hynek's earlier statement is to be given greater credence.

It is Project Blue Book that is the raison d'etre of this book, and in the next to last chapter, we are given a copious, though not quite thorough, statistical analysis of the Air Force's Blue Book records. Hynek has consistently criticized the Air Force's UFO investigations as being far too skeptical, implying that the Air Force displayed little more than a knee-jerk debunking reflex whenever the term *UFO* was mentioned: "Once the decision was made that UFOs had to be figments of the imagination, the Air Force policy on UFOs never changed direction. 'It can't be, therefore it isn't' became the guiding principle, and anyone associated with Blue Book, from Director on down, learned to follow suit or else" (p. 33). The Air Force was excessively skeptical about UFOs, says Hynek.

The official Blue Book records show that 94.44 percent of the cases had prosaic explanations; only 5.56 percent are carried as "unidentified." (Hynek presents a great many Blue Book statistics, but avoids a clear summation; we'll

see why in a moment.) But how realistic were the Air Force's classifications? Were there many "unexplainable" cases hidden in the 94 percent which were simply *debunked*, as Hynek ceaselessly claims, and never really identified? Working with an unnamed associate from the Center for UFO Studies staff, Hynek has "comprehensively re-evaluated all the cases which comprise the ninety-four reels of microfilmed Project Blue Book records," some 13,000 cases. What is the result of this most commendable Herculean effort? Hynek and his partner found that, after eliminating all cases for which insufficient information was available, 94.2 percent of the cases had prosaic explanations; only 5.8 percent were considered "unidentified." In other words, *Hynek's reevaluation of the Blue Book record resulted in virtually the same percentage of "unknown" cases as the Air Force concluded:* 5.8 percent versus 5.56 percent. Thus Hynek's own figures do not substantiate his oft-repeated charges that the Air Force set out to debunk UFOs regardless of the merits of the sighting. We now see why he is careful to give the Air Force "unknowns" only by the month, or for a single year: the reader has no opportunity to see the embarrassing fact that Hynek and the Air Force are in substantial agreement.

In fact, if one examines the two analyses of the Blue Book cases very carefully, a startling fact emerges. Hynek's percentage of "unknowns" is enlarged because he does not include the "insufficient information" cases in his total, as did the Air Force. The official Blue Book records show 701 "unidentified" cases (a number not found, of course, in Hynek's book). *Looking at the same cases in the same files, Hynek finds only 640 that supposedly are without explanation. In actuality, Hynek now finds fewer "unexplained" cases in the Blue Book files than did the Air Force!* (Although he doesn't admit it.) This finding totally invalidates the book's central thesis of Air Force pig-headedness. Yet Hynek continues to travel around the country, appearing before audiences and TV cameras, to accuse the Air Force of having practiced "it can't be, therefore it isn't." Any lingering suspicions the reader may have that UFOlogy might be a legitimate protoscience should be safely dispelled by the unscientific behavior of the leading UFOlogist of our day.

Do the "unknowns" in the Blue Book files signify the existence of some significant and genuinely unknown phenomenon? Hynek's recent reevaluation has reduced the number of "hard-core unknowns" from 701 to 640. Concentrating on the "classic" supposed unknowns remaining, we find that many of the most celebrated ones—Bentwaters-Lakenheath, Father Gill, Socorro, Newhouse, McMinnville, Trindade, Mariana, to name a few—have been challenged by skeptics, and prosaic explanations have been offered. (Hynek *never* gives the reader the facts about these proposed solutions, and only obliquely indicates in a few places that solutions have ever been proposed, never specifying by whom.)

The approach of those claiming significance for the "unexplained" cases is to substitute quantity for quality: no *one* case will stand up to careful scrutiny; but given enough of them, it is presumed that at least a few cases must be valid, even though it is impossible to say which ones. Why is there no such thing as a "make or break" critical observation in UFOlogy, one on which the "UFO evidence" will stand or fall, since we recognize the importance of critical observa-

tions in real scientific disciplines (i.e., the displacement of light in the sun's gravitational field, crucial to Einstein's theories)? Simply stated, it is because the supposed UFO evidence rests entirely on the weight of uncorroborated human testimony. We often hear it said that pilots and other skilled persons are such solid citizens that their testimony cannot conceivably be called into question. Yet there is another finding from Hynek's reevaluation of the Blue Book file that also seems to undermine the overall message of the book: "Surprisingly, commercial and military pilots appear to make relatively poor witnesses (though they do slightly better in groups)" (p. 271). In short, there is *no* category of observer so overwhelmingly reliable that his UFO report can be taken at face value.

Hynek fancies himself the "Galileo" of the new science of UFOlogy. Yet if the science of the orginal Galileo amounted to nothing more substantial than this, it is a safe bet that his name would have faded into oblivion long ago. ●

Correction

In "An Empirical Test of Popular Astrology," by Ralph bastedo (Fall 1978), the last sentence of footnote 14, page 35, should read: "With 1.0 degree of freedom and a chi-square of *0.006*, the probability value was .91."

The phrase "random choice" in the fourth line of the fourth paragraph on page 31 should read "random *chance*."

Knowledge or certainty

There is no absolute knowledge. And those who claim it, whether they are scientists or dogmatists, open the door to tragedy. All information is imperfect. We have to treat it with humility.

—*J. Bronowski, in* The Ascent of Man

From Our Readers

Abell clarifies comments

I have received several letters concerning my review of *Scientists Confront Velikovsky* in Vol. 2, No. 2, of the SKEPTICAL INQUIRER, some favorable and some critical. I am not surprised to receive criticism from ardent followers of Velikovsky, but I was saddened to receive a concerned letter from Dr. J. Derral Mulholland, a fellow astronomer for whom I have high respect, and with whose views I am sure I am in complete agreement. Dr. Mulholland felt that I had misread or misinterpreted parts of his chapter in *Scientists Confront Velikovsky*, and on studying his letter, on rereading his chapter, and rereading my comments about it, I have come to the conclusion that he is correct, and I feel that I owe him an apology. Let me set the matter straight.

I had *not* intended to pan Dr. Mulholland's chapter; I felt then, and think now, that it is a valuable contribution to the symposium. My point was that Velikovsky's speculations are so utterly incompatible with well-established evidence that celestial mechanical arguments alone should be enough to completely devastate them. On first reading, I felt that Dr. Mulholland's arguments did not go as far as they might have to make the case a strong one. I realize now, however, that he was strongly limited in space, both in the symposium itself and in his written chapter. Dr. Mulholland wrote, therefore, very succinctly, and his chapter must be read carefully. Considering the space he had, I must admit that he did quite well at that.

On questioning three minor "slips" in his chapter, I now realize that I was partly nit-picking and partly more careless than I accused him of being. I had, for example, questioned what accurate clocks have to do with the determination of latitude. But Mulholland was *not* saying that clocks were needed to determine latitude, but that latitude must be known for certain kinds of clocks, specifically sundials, to read the correct time, which is, of course, true. I had also wondered if Dr. Mulholland had meant to say that "one cannot rule out a year that differs by 1 or 2 percent from 365 days" during recorded history. Velikovsky had argued that the number of days per year varied much more than this in biblical times, and I assumed that Dr. Mulholland was referring to this claim. A careful reading of the next two paragraphs in Mulholland's chapter, however, makes it clear that he was referring not to historical times but to periods hundreds of millions of years ago; and, in fact, he states (bottom of page 109) that abrupt changes in the length of the day of the sort suggested by Velikovsky could not have occurred during the times of his alleged events.

The final statement of Mulholland's that I questioned in my review was whether he meant to refer to the Oort comet cloud as a "belt" of comets (in the printed version, the word "cloud" was inadvertently omitted,

and was missed in proofreading). Oort's hypothesis, which seems consistent with much recent analysis of comet observations, is that comets originate from a roughly spherical cloud extending some tens of thousands of astronomical units from the sun and that those comets we observe have been diverted to the inner part of the solar system by successive gravitational perturbations by passing stars. It seems to me that the Oort cloud is not well described as a "belt" analogous to the asteroid belt. However, Dr. Mulholland has pointed out to me that there have been serious studies of the possibility that the original distribution of comets was in a *belt* in the plane of the solar system. Recent studies, I think, make a good case that the present distribution of comets is better described as a "cloud," but this is indeed a trivial point, hardly worth bickering over in the context of a discussion in which Dr. Mulholland and I are in overwhelming agreement in all essential respects.

The point I tried to make in my review, and which I reiterate here, is that there is *no* debate within the scientific community concerning the feasibility of the astronomical speculations of Velikovsky. There is, of course, debate on many scientific hypotheses, and many hypotheses with only one or a very few supporters are still viable ones. But these ideas concern matters at the frontier of science. Two examples in astronomy are the nature of the red shifts of quasars and the nature of the microwave background radiation. Nearly all extragalactic astronomers are of the opinion that the very large shifts in the spectral lines of quasars indicate that they have enormous speeds away from us, and lie at extremely great distances, but a few (in particular, H. C. Arp at the Hale Observatories and G. Burbidge at the Kitt Peak National Observatory) are not convinced that there may yet not turn up an alternative explanation for those red shifts. And most cosmologists regard a faint glow of radiation at microwave radio wavelengths as evidence of the big bang that started the expansion of the universe, but some (for example, Fred Hoyle and J. V. Narlikar) have radically different interpretations. Neither of these matters can be regarded as completely settled; for scientific debate, albeit not much debate, remains. These matters still belong to the frontier of science.

The details of the origin of the solar system are also still in question, although there is growing consensus on the general picture. But some matters *are* settled; they are in the old ground that has been well sifted over—indeed, trampled to death—hundreds of years ago. If we accept as axiomatic that there is an external world and that all we see and sense about us is not a dream or collective hallucination, we must conclude that the earth is spherical, not flat, and that it does rotate on its axis and revolve about the sun. These were frontier speculations at one time, but not today.

Similarly, Velikovsky's ideas about the recent history of the inner solar system may have been tenable in the light of what was known in the fifteenth century, but today they are simply terribly naive. We might not be surprised if a schoolchild came up with such theories, but would politely explain to him why they cannot be correct. But for a grown man to propose them and for a large segment of our modern society to seriously regard them viable theories at the frontier of science strikes me as incredible. It is not that science is in any way *threatened* by Velikovsky's assertions. Our space programs still guide probes to the planets with the use of Newton's laws, not Velikovsky's, and electronic engineers still apply the theory of elec-

tricity and magnetism of Maxwell, not Velikovsky. Rather, it is the communication between scientists and the public that seems to have gone awry, and public education in science that is threatened.

I apologize to J. Derral Mulholland for a too-quick reading of his chapter and for poorly worded comments on it in my review. He is a highly qualified astronomer and a recognized authority on celestial mechanics; and although we approach science from different areas of expertise and may choose to write with different styles and emphasis, there is no disagreement between us concerning the fundamental issues addressed in *Scientists Confront Velikovsky.*

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Gauquelin on Rawlins

The increasing evidence for a Mars effect upon sports champions seems to be seriously disturbing certain members of the Committee for the Scientific Investigation of Claims of the Paranormal (CSICP). This is understandable, since the Mars effect has been replicated beyond any doubt by an a priori hostile group of Belgian scientists (the Comité Para of Brussels) and, more recently, the results of the Zelen test (*The Humanist*, Nov./Dec. 1977) have confirmed that the Mars effect, observed with sports champions, is not observed at all with nonchampions born on the same day and in the same place.

How, in spite of all of this, could one distort and misrepresent the effect in question and sow doubt on the subject? Dennis Rawlins, a member of the CSICP and of the editorial board of *The Zetetic* (now the SKEPTICAL INQUIRER) has done just this in a polemic which appeared in the Fall-Winter 1977 issue of that journal. His "thesis," if one could call it that, is that the more one brings together data on the births of sports champions, the less distinct the results become. He goes on to talk of "astro-missing," which is to say that the observed frequencies of the sports champions were apparently less than the theoretical frequencies in some cases. In his article, he accuses me of altering both the numbers and the graphs. Here, without useless polemics, are some readily verifiable facts that will serve to establish the reality of the matter.

1. *In their replication of my work, the Comité Para of Brussels found a percentage of sports champions born with Mars in "key sectors" (the rising and the culminating sectors, numbers 1 and 4) that is greater than the proportion I had oberved.*

In the group of 1,553 champions gathered by myself, 332 were born with Mars in key sectors, which is 21.4 percent; while the expected frequency among the nonchampions was only 266, which is 17.1 percent. The difference is very significant.

In the group of 535 other champions gathered by the Comité Para, 119 were born with Mars in key sectors, which is 22.2 percent; while the percentage amongst the nonchampions remained 17.1 percent (expected frequency 91.7). This difference is also very significant. (According to the first listing of the results I received from the Comité Para in October 1968, the actual frequencies of Mars in key sectors were 120 instead of 119.) To prove this, I have included here (Table 1) a copy of the table published by the Comité Para giving their observations (from *Nouvelles Breves*, 43, Sept. 1976, p. 330). One can read there that the distribution of Mars among the 535 champions compared to a theoretical

distribution gives a chi-square of 26.66, largely significant at the .01 level (24.7). The Comité Para wrote in the same document (page 331) this unequivocal declaration: "The distributions of the actual frequencies of Mars is far from uniform: they display the same general pattern found by M. M. Gauquelin with samples of other sports champions, the main characteristics being a clear predominance in sector 'I' (rising) above all the others. The Comité therefore gives its agreement on this point with the results of M. M. Gauquelin."

2. *Dennis Rawlins, very well informed on certain objections of the Comité Para against my work, had already shown in a 1977 memorandum that these were without foundation.*

In spite of their own replication and statement, the Belgian Comité Para, more than anything, does not want it understood that it has demonstrated the existence of the Mars effect beyond any possible doubt. Without furnishing any proof, it insists, after the fact, that all the Mars effect could be explained by demographic and astronomical conditions in which the sports champions were born. The results of the experiment suggested by Marvin Zelen have shown the inanity of such a hypothesis: the thousands of nonchampions born in the same astronomical and demographic conditions as the champions do not display any Mars effect.

If there is anyone that the results of the Zelen test did not surprise it is Dennis Rawlins. In March 1977, he drafted a text in which he discusses the objections of the Comité Para of Brussels. This text, addressed to certain members of the CSICP, is entitled "Memorandum on the Relation of Mars' Solar Proximity to M. Gauquelin's Mars-Sports Results and Claims." Using astronomical arguments, Rawlins rejects the objections of the Comité Para and writes: "Therefore, one concludes that Gauquelin has made fair allowance for the effect under investigation." (For more than a year D. Rawlins refused to make his memorandum public. He finally accepted [see *Phenomena*, May-Aug. 1978, p. 22, Toronto]. Note that the memorandum was not published in *The Humanist* or in the SKEPTICAL INQUIRER.)

TABLE I

Classe (i)	Fréquence observée $f^{o}_{(i)}$	Fréquence calculée $f^{th}_{(i)}$ (*)	$\Delta f = f^{o}_{(i)} - f^{th}_{(i)}$ (*)	$\frac{(\Delta f)^2}{f^{th}_{(i)}}$ (*)
1	68	47,7	+20,3	8,64
2	47	46,9	+ 0,1	0,00
3	36	45,3	− 9,3	1,91
4	51	44,0	+ 7,0	1,11
5	36	43,2	− 7,2	1,20
6	30	42,7	−12,7	3,78
7	36	41,6	− 5,6	0,75
8	50	42,2	+ 7,8	1,44
9	53	43,7	+ 9,3	1,98
10	54	45,2	+ 8,8	1,71
11	40	46,2	− 6,2	0,83
12	34	46,4	−12,4	3,31
Total :	535	535,1		26,66 = χ^2

There are many other things to say about Dennis Rawlins' text. For instance, he writes: "If subsequent retestings fail to confirm Gauquelin's theories, can he not similarly say: 'My observations concern births occurring in Western Europe before 1945.' " In my books and papers I pointed out many times that the planetary effect on professionals, especially the Mars effect on sports champions, can only appear if two main conditions are respected: (*a*) *Famous people*: in any sample of sports people, one has to select famous sports figures (olympic champions, etc.) for observing the Mars effect. Middle class sportsmen do not display the effect. I devoted an entire book, *Les Hommes et les Astres*, 1960, for demonstrating that the intensity of the effect is tightly related to the degree of achievement: the book will probably be translated into English next year; (*b*) *Natural births*: the planetary effect cannot appear if the delivery is not natural. For instance, we wrote in *Cosmic Influences on Human Behavior* (1973, p. 202): "As the 'natural' diurnal rhythm of delivery is disappearing, so too is the planetary effect. Modern medical practices are replacing the cosmic environment and masking its role. Our observations stop in 1945. But today there are many more new obstetrical techniques. The very onset of labor is often induced artificially for reasons of convenience. A study on the planetary effect made on births today would necessitate a concerted effort to separate physiological births from births induced by medical means."

The planetary effect is not an occult one and, like all scientific facts, it has to be verified under precise experimental conditions. Concluding, I will content myself by repeating Rawlins' last words: "For these reasons I question whether Gauquelin's work is worth investigating by the Committee for the Scientific Investigation of Claims of the Paranormal at this stage—that is, until he can indicate some practical use of it. (He might, for example, show how to beat the posted odds on sports events by using Mars' placement in contestants' mundane horoscopes. This would, happily, put the burden of bias-sorting on his shoulders instead of the Committee's)." These remarks sum up the philosophy of the author, do they not? And I ask the question: How many other members of the Committee agree with Rawlins' attitude?

Michel Gauquelin, Director
Laboratory for the Study of the
Relations between Cosmic and
Psychophysiological Rhythms
Paris, France

Dennis Rawlins replies:

I fully agree that the Comité Para results are statistically significant. However, that is a question distinct from whether the specified hypothesis *was confirmed (see my article, p. 81): dominance of sectors 1* and *4. Incidentally, the slight difference mentioned in my article between Comité Para and Gauquelin figures was simply due to Gauquelin's use in the January/February 1976* Humanist *of the out-of-date 1968 Comité Para scores (corrections published by the Belgian group in March 1975). The more recent data place Gauquelin's favored sector 4 in fifth place (if compared with expected calculated frequency, see Table 1 in Gauquelin's letter above)—not very impressive in a 12-horse race—which only shows a little more clearly that the specified hypothesis was not confirmed by the Comité Para test.*

I unqualifiedly agree with all of number 2 in Gauquelin's letter. Indeed, a continuation of the ill-conceived Zelen-Abell test would only

confirm it all the more strongly.

If Gauquelin wishes to point out that I knew (without even having to read it) what the gist of his excuse for nonreplicability would be, okay.

Finally, the "philosophy" to which Gauquelin objects in his final sentences is nothing but verification by pragmatic unambiguous, replicable, experimental prediction. Some people call it "science."

Note added in proof: Gauquelin inserted the "famous persons" loophole into his letter on October 29, 1978, after my above remarks were written, having learned since he originally composed his letter that the attempts to replicate his work in the U.S. had failed. Anyone consulting my article will note that the main reason I felt Gauquelin's claims were not worth investigating was that he would loophole his way out of any replication failure. Gauquelin's generous double-dip fulfillment of this prophecy is as much an embarrassment to the Humanist *as it is to Gauquelin.*

As for my nonpublication of the much-discussed memo of March 29, 1977, I agreed to the transmission of the memo to Gauquelin shortly after it was written. (This is hardly consistent with the picture of suppression Gauquelin is conjuring up, though I was quite mistaken in supposing that the memo's private circulation could accomplish its purpose of steering investigators away from a course it showed to be a blind alley.) Gauquelin attempted to misuse a quotation from the memo in a late-August 1977 version of his article in the November-December 1977 Humanist. *Upon the* Humanist*'s inquiry I then asked it to correct this and publish my views on Gauquelin, which ran counter to those of Zelen, Kurtz, Abell, and Jerome. Instead, Gauquelin's quote from the memo was simply dropped and my assessment of the Gauquelin situation again not printed.*

It should be clearly understood that the CSICP as a body never had anything to do with the Humanist *Zelen test "challenge" (*Humanist, *Jan.-Feb. 1976) or Jerome's erroneous statistical criticism of Gauquelin (*Humanist, *Sept.-Oct. 1975). Both were published before the Committee was founded. No* Humanist *paper on Gauquelin was ever approved by anyone on the CSICP Council knowledgeable in astronomy or statistics—to the contrary. And the only citation in the* Skeptical Inquirer *(then the* Zetetic*) accepting any of it (McGervey, 1:2, p. 50) was specifically protested at the time—indeed my memo was that very protest.*

—Dennis Rawlins
Council, CSICP
San Diego, Calif.

Anthropology and the fringe

My first reaction to John R. Cole's article "Anthropology Beyond the Fringe," in the Spring/Summer 1978 Skeptical Inquirer, was to write an article debunking it.

On further inquiry and a bit of thought I came to recognize that there was no way so biased a "journal" as the Skeptical Inquirer would ever accept such an article for publication.

Alternatively, I quickly jotted down the most obvious corrections (one could be made to virtually every line of the article) to send you and other interested parties. For those who judge reality more by how it is put than from the data it purports to be based on, the Cole article, coupled with my corrections, should be enough to totally convince them of the reality of PK, psychic archaeology, Phoenecians in North America, and the frequency of UFO visitations.

It should also more than suffice to convince any sane scientist that the

SKEPTICAL INQUIRER is anything but scientific.

Joseph K. Long
Plymouth State College
University of New Hampshire
Plymouth, N.H.

John R. Cole replies:

Joseph K. Long has written a three-page, single-spaced "correction" to my article "Anthropology Beyond the Fringe." His manuscript is being circulated widely, I gather, as a substitute for a formal reply article. Requirements of space and format preclude reprinting his comments verbatim, but they should be noted.

Long stresses that paranormal phenomena may exist and if so should be studied; that there are practitioners of bad science and outright cranks on the periphery of any *discipline, not just anthropology; and that anthropologists as a group should not be characterized as racist or antiscientific. I could not agree more. Long stresses his skepticism regarding hyperdiffusionism, Castanedaism, "ancient astronauts," and many ESP claims. Again, I agree with him heartily.*

*Unfortunately, we part company on some questions he raises, although I stand corrected on one point: I attributed the recognition of the Parapsychological Association by the AAAS to the time of the latter's presidential tenure of Margaret Mead. Mead was president in 1976, but the PA was recognized in 1969, Long notes. Nevertheless, as an active member of the AAAS in 1969, she was instrumental in AAAS's voting to give affiliation to the Parapsychological Association (*SKEPTICAL INQUIRER *2:1, 1977, p. 82).*

Other complaints raised by Long include some that are potentially more serious, especially if they are circulated among people who did not read my original article. (I hope they will be inspired to check what I actually wrote.)

First, I commented on a news account of a paper given by Long at the 1977 meeting of the American Anthropological Association, which I did not hear. (Although two colleagues described it to me sufficiently to suggest that the news account was fairly accurate, I felt I should not criticize Long second-hand and thus did not mention his name but, rather, sought to underscore what I thought was a popular appetite for rather sensational subjects—in this case, stories of a coffin traveling about under its own power.) Long writes that he "neither implied that a paranormal explanation was the most correct nor said 'that either it had happened or there was at least something going on unexplainable by normal science'; in fact, I [Long] actually made an 'explanation' (not necessarily logical or correct) that probably Cole would have accepted, viz., that it was mass hallucination." But the Houston Post *quoted Long as offering* this *alternative to the insider's explanation: "Only slightly more acceptable is my own speculation that this may have been an example of mass telepathic hallucination followed by scattered hallucinations away from the original scene." I did not read "mass telepathy" to be a "normal science" explanation, since I am unaware of any studies documenting telepathy. I did err in referring to Haitian rather than Jamaican voodoo, as Long notes, but I think my basic point remains. I am happy to learn that he is more skeptical than the news article led me to believe.*

Although I did not cite him by name, my comments on his paper (or the reporting of it) seem to have given offense and may explain some of his other objections to my article. I take offense at his assertion that I wrote the article with the "clear understanding of two guiding principles: (1) Nobody reads the SKEPTICAL INQUIRER *anyway; so no matter how badly written or documented the article, the editor will take it (but I'll omit naming 'real' anthropologists just in case they might sue me, and this way nobody will tell them their names are there); and (2) publication is*

necessary for jobs, tenure, and promotion, and colleges seldom actually look at the articles which are listed on CVs [curricula vitae]—besides, it is so much easier to go through a supposed 'debunking' and 'guilt by association' than to do either traditional research or pioneering work in a difficult field like ESP." He adds that "this article and its acceptance for publication are totally irresponsible both scientifically and ethically." He is mistaken.

Second, "Cole's assertions about anthropologists are insulting, incorrect, and totally off-key." My assertions supposedly include charges that anthropologists are racists and that some request a priori belief. I am said to claim that Barry Fell, Robert Ardrey, and others are anthropologists when they are not. This is a misreading of my article, simply. Long seems to say that if an argument is good it is anthropology, but that if it is bad it is not. I was dealing with what seemed "bad" arguments in the subject area of anthropology—usually by nonanthropologists (a subtle distinction not always obvious to the layman). But trained anthropologists are *sometimes involved in "fringe" claims and racism, despite the fact that anthropology as a discipline has, as Long stresses, been in the forefront of antiracist, socially responsible uses of science. That was perhaps the main reason I adopted anthropology as a career. I do not believe I implied otherwise.*

Long writes that I erred in implying that anthropologists sometimes are aloof from the public, thus insulting the many social-activist anthropologists. The responses to my article that I have received (except Long's) have been very favorable—except for a few that have taken me to task for wasting my time on "popularizing." There is some *elitism in anthropology, as there is in any science. Long himself dismisses Barry Fell as "almost too facetious to bother debunking," even though countless people take him* very *seriously. Similarly, he dismisses Jeffrey Goodman's book* Psychic Archaeology *as a "popular, nonscientific book, written for monetary need, virtually to the publisher's specifications" and not worthy of criticism. But Goodman, a Ph.D. in anthropology, writes of cultural and biological "motherlands" in Atlantis and Lemuria, among other things. How is the public to judge "real" anthropology from bunk in such a case? A "real anthropologist" seems to be involved. And Goodman's book features a cover blurb quoting Joseph K. Long saying it is "a milestone for science."*

Third, "scientists do not even use the words prove *and* proof *as Cole does (proofs exist in philosophy and mathemathics, and in the scientific world of probabilities, proofs are nonexistent)." As Long notes, I used "proof" too loosely. When I asked that "revolutionary claims prove themselves," I should have said "test," or perhaps "prove their worth"—not prove themselves absolutely. Yet many of the people I criticized do believe in "proof," and in those cases I was using it as their word rather than mine. I agree with Long that "scientific Creationism" is self-contradictory, but he is mistaken when he asserts that no one tries to "prove" Creationist alternatives to Darwin scientifically: witness the Creation Research Society, which would disagree with us! And the September/October 1978* Humanist *notes a credit course at Iowa State University taught by the dean of engineering, whose goal is to disprove evolution and prove Creationism scientifically. Again, it seems Long excludes from the realm of science things that the public does not. "Science" and "proof" are terms we should all use more carefully, but I was writing for a general audience and not just scientists. I am not as optimistic as Long is that even scientists know how to evaluate science, at least outside their own areas, because we cannot dismiss by intuition arguments about alien topics as easily as Long implies.*

Fourth, Long writes that "the article sounds more like a sideshow

barker than an anthropologist; is Cole really an anthropologist?" In reference to my confusion of the date of Margaret Mead's election as AAAS president, Long remarks, "God, what an 'acid head' Cole must be!" Elsewhere he says that my page 69 and footnote 6 are "entirely garbled." "What does Cole believe or not believe? . . . Sounds like he's had too many out of body experiences." In these days of Big Brother, circulating jokes like these is not to be encouraged. More important, perhaps, the suggestion that my article was crazy or garbled or unethical or maliciously intended is an ad hominem argument unworthy of Dr. Long. I am surprised that he is circulating such comments. Why does it seem to be impossible to have professional disagreements without assailing the integrity of those with whom one disagrees? Having a Ph.D. in anthropology does not make me right in an argument, but I would think it would make me immune to questions about whether I have training in anthropology.

Long is a reputable scholar. I regret having offended him, but I regret even more the kind of cavalier misreading of my article that seems to have occurred—especially the implication that I was slandering the anthropological profession, whose best traditions I cherish as much as Dr. Long does. I hope he is wrong in dismissing the SKEPTICAL INQUIRER *as hopelessly biased, and I take offense at his assumption that it would not welcome an article making a good case for paranormal phenomena, supported by good empirical evidence.*

John R. Cole
Pelham, Mass.

A response to Sturrock

Dr. Peter A. Sturrock challenged on several points my critical review of his report on his UFO survey of members of the American Astronomical Society. Both my review and his response appeared in the Fall/Winter 1977 issue of *The Zetetic*. Because of my own busy schedule, which included five out-of-country trips, it was not until June 18 that I was able to respond to Sturrock's challenge with the following letter:

> You disclaim responsibility for "articles published in the news media unless I wrote those articles." Surely you must know that the purpose of a press release is to try to give newspaper reporters an accurate capsule summary and to try to help them write an accurate article. . . . If you were not aware of the importance of handing out an accurate press release, Mr. Robert Lamar of the Stanford University News Service could have explained its purpose.
>
> When I asked Lamar on April 26, 1977, whether you had reviewed and approved the press release that so strongly influenced all of the news media articles, he replied: "Very definitely. He [Sturrock] looked it over very carefully and made some changes that I thought improved it." Now you try to disclaim responsibility for news stories that followed, almost word-for-word, the press release that you yourself helped to write and which you approved for distribution.
>
> I ask that you ask your survey respondent to supply you, for my use, the name of the Navy vessel involved in the [UFO] incident in 1951 which [allegedly] was equipped with a height-finder radar, so that I can then check official records to verify. Informal queries to the Navy have yet to locate anyone now on board who recalls the operational use of height-finder radar in 1951, but with a specific vessel name, or number, official records can be easily checked.
>
> You refer to my statement that you had attempted to obtain a grant

of one-quarter million dollars from charitable foundations for use in your UFO studies as a "rumor," and imply that this did not occur.

If you will check your files you should find a copy of your letter of Jan. 16, 1976, to Mr. Nils Y. Wessel, president of the Alfred P. Sloan Foundation, in New York, in which you sounded him out about a three-year grant for UFO research and cited a figure of $75,000 per year ($225,000) plus University overhead and management fee. If you fail to remember this letter of yours, I can supply a photo-copy.

On June 23, I received a letter from Sturrock's secretary, saying he was on vacation for two weeks and that she had not been able to find the letter to the head of the Sloan Foundation. She asked me to supply a copy.

On July 2, I sent a copy of the lette to Sturrock's office, along with a portion of another letter that Sturrock had written to an official of the American Institute of Aeronautics and Astronautics seeking AIAA's intervention in support of Sturrock's financial request to the Sloan Foundation.

When I failed to hear from Sturrock, I wrote to him on July 27, seeking a response and acknowledgement that he had written the two letters which went out over his name. When I failed to hear from Sturrock I wrote to him again on August 18, and still again on September 25.

In late October, Sturrock finally acknowledged my letters but made no substantive response.

Readers can draw their own conclusions, as I have done.

Philip J. Klass
Washington, D.C.

Editor's note: On September 30, in interests of fairness, the editor sent a further invitation to Dr. Sturrock to respond for publication to the points in Mr. Klass's letter. His reply follows.

Sturrock's response to Klass

1. The headlines and press release which Mr. Klass refers to were not part of the report which Mr. Klass undertook to review. My own summary of my report is given on pages 2–6. I repeat that "I am not responsible for articles published in the news media unless I wrote those articles."

2. Since I guaranteed anonymity to my respondents, I am unwilling to disclose information which would potentially identify the air controller (also an AAS member) responsible for the radar case RA 1. I refer him and the reader to item 8 of my response. Alternatively, Mr. Klass may wish to consult someone with expertise in radar.

3. As with item 1 above, the fourth paragraph of Mr. Klass's letter concerns one of the many topics in his "review" which have nothing to do with my report. I note, with some surprise, that Mr. Klass himself chooses to interpret the statement "Mr. Klass believes A" as being equivalent to "A is false."

The fact that Mr. Klass obtained possession of copies of private correspondence without the knowledge or permission of the parties to the correspondence indicates some intelligence capability and a willingness to use it. Although I personally do not approve of such activity among the private sector of the community, I realize that it is an accepted part of the stock-in-trade of the honored profession of journalism. With this in mind, I suggest that, if Mr. Klass wishes to obtain a fuller understanding of my fund-raising activity during 1975-76 and is willing to employ intelligence methods to get it, he consider the following steps: (a) he submit the (complete) letters in question to one of the friendly local intel-

ligence agencies for textual analysis; (b) he hunt down all the proposals which I sent out in the period 1975-76 (since most of them went to Washington, this should not be too difficult); and (c) he penetrate the Institute for Plasma Research (this should not be difficult, since security here is as lax as it is at the headquarters of the American Institute of Aeronautics and Astronautics). .

4. An innocent reader may well be bewildered by what purports to be a "review" of a scientific report (which is quite unlike any review one will find in any reputable scientific journal), undertaken on behalf of an ostensibly "scientific" committee, namely the Committee for the Scientific Investigation of Claims of the Paranormal. Viewed in such a light, the "review" and its follow-up may well be incomprehensible. As an attempt to clarify the situation for the puzzled reader, I would point out that this committee, including Mr. Klass, are concerned with topics which are to some extent heretical. Heresies, which occur in science as well as in religion, concern propositions which are perceived to be opposed to the orthodoxy of the establishment—whether it be scientific or religious (Encyclopedia Britannica, 1959 ed., vol. 11, p. 499). With this definition, it is clear that a heresy can exist only in relationship to an "establishment," and that a heresy must therefore be to some extent—perhaps to a large extent—political in nature. Since at this time the proposition that the UFO phenomenon is real, strange, and scientifically significant is a scientific heresy, it follows that any discussion of this topic may be scientific, political, or some strange mixture of the two.

To help the interested reader to identify the approach adopted by a given writer, I offer for his consideration the following short and approximate guide:

a. *The most effective scientific persuasion is rational; the most effective political persuasion is not.*

b. *Scientific debate should center on the major issues and avoid digression into irrelevancies; an astute political debater will, if he is losing in one area, shift the focus of the debate to an area he considers more favorable, whether it is relevant to the major issue or not.*

c. *Scientific information is normally open, except for restrictions on doctor-patient, . . . etc., confidentiality; a seasoned politician keeps a bank of secret information.*

d. *A scientist will attempt to verify information before using it; a politician may or may not do so.*

e. *A scientist—or any scholar—will normally seek permission to quote in public from private conversation or private correspondence which might embarrass the other party; a political polemicist will seek out opportunities to publicize his perceived opponent's unguarded remarks.*

f. *Scientific discussion should avoid personalities; political discussion often centers on personalities. . . .*

My own conclusion from this exercise, when applied to Mr. Klass's "review" and other writing, is that his goals and methods are primarily political. Mine are not. Hence, as past experience sadly testifies, there is scant possibility of any fruitful communication between us. It is true that I have in the past suffered through one long exchange of correspondence with Mr. Klass. Not being a masochist, I have no wish to repeat the experience.

Peter A. Sturrock
Prof. of Space Science and Astrophysics
Institute for Plasma Research
Stanford University
Stanford, California

Philip J. Klass replies:

My copies of Sturrock's letters seeking funds for UFO studies from the Sloan Foundation and requesting support from the AIAA for his request were supplied to me on the initiative of one of the many persons who received copies. If Sturrock wished the letters and their contents held in confidence, it is unfortunate that he failed to so indicate anywhere in the letters.
—P.J.K.

Faulty sense of reality

I have been reading the SKEPTICAL INQUIRER with great interest and support the Committee's devotion to challenging claims of paranormal phenomena by subjecting them to scientific scrutiny rather than by dealing in the personalities of the proponents. However, it is inevitable that examples arise in which Committee members marvel aloud (and in print) at the "naiveté" of the proponents in question, and it is to this label of naiveté that I address my remarks.

Although much of the sloppy thinking of many paranormalists may be attributable to mere naiveté, and making light of such persons by nominating them for a "Uri Award" may seem appropriate, one is obligated to consider the possibility that some of these people may be not merely naive but, rather, afflicted with a thought disorder that manifests in, among other possible symptoms, a faulty sense of reality. "Ambulatory schizophrenia" is an entity in which the subject, generally free of symptoms, develops them only under certain circumstances (classically, stress).

It is my opinion that much of the irrational behavior of many paranormalists may be more compatible with a diagnosis of ambulatory schizophrenia (or a close cousin thereof) than with mere naiveté. Whether I am correct or not, our duty to challenge paranormal claims by scientific investigation remains unchanged. However, as we continue to encounter bizarre intellectual behavior, refractory to reasoned arguments, the possibility of a true thought disorder should be considered before bestowing a "Uri Award" for silliness or naiveté.

Gary P. Posner, M.D.
Maryland General Hospital
Baltimore, Md.

Martian technology

I would like to point out that the recent Mariner and Viking missions have established beyond reasonable doubt the existence of a Martian civilization with a very high level of technology.

The ability to *completely* camouflage, within a period of a few years, the planetwide system of canals is in itself an extraordinary engineering achievement. But it is quite surpassed by the scientific feats of (*a*) predicting the Viking landing sites and (*b*) decontaminating the areas concerned with such thoroughness that all traces of organic material were removed.

I understand that those noted scholars Erich von Däniken and Charles Berlitz are now racing each other to present these sensational conclusions to the world.

Arthur C. Clarke
Colombo, Sri Lanka

Scientific Consultants

These scientists and scholars are consultants to the Committee for the Scientific Investigation of Claims of the Paranormal.

John R. Cole, anthropologist and writer

J. Dath, professor of engineering, Ecole Royale Militaire, Brussels, Belgium

Sid Deutsch, professor of bioengineering, Rutgers Medical School

J. Dommanget, astronomer, Royale Observatory, Brussels, Belgium

Naham J. Duker, assistant professor of pathology, Temple University

Frederick A. Friedel, philosopher, Hamburg, West Germany

Robert E. Funk, anthropologist, New York State Museum & Science Service

Laurie Godfrey, anthropologist, University of Massachusetts

Donald Goldsmith, astronomer; president, Interstellar Media

Henry Gordon, magician, Montreal

Stephen Jay Gould, professor, Harvard University

Norman Guttman, professor of psychology, Duke University

Edwin C. Krupp, astronomer; director, Griffith Observatory

Richard H. Lange, M.D., chief of nuclear medicine, Ellis Hospital, Schenectady, New York

David Marks, professor of psychology, University of Otago, Dunedin, New Zealand

Joel A. Moscowitz, assistant clinical professor of child psychology, University of California, Los Angeles

William Nolen, M.D., Litchfield Clinic, Litchfield, Minnesota

Robert B. Painter, School of Medicine, University of California

John W. Patterson, professor of materials science and engineering, Iowa State University

James Pomerantz, assistant professor of psychology, State University of New York at Buffalo

Robert H. Romer, professor of physics, Amherst College

Milton A. Rothman, professor of physics, Trenton State College

Robert J. Samp, M.D., assistant professor of education and medicine, University of Wisconsin-Madison

Erwin M. Segal, professor of psychology, State University of New York at Buffalo

Elie A. Shneour, biochemist; president, Biosystems Assoc., Ltd., La Jolla, California

Barry Singer, associate professor of psychology, California State University, Long Beach

Waclaw Szybalski, professor, McArdle Laboratory, University of Wisconsin-Madison

Ernest H. Taves, M.D., psychoanalyst, Cambridge, Massachusetts

The Committee for the Scientific Investigation of Claims of the Paranormal

The Committee for the Scientific Investigation of Claims of the Paranormal has the following objectives:

- *To establish a network of people interested in critically examining claims of the paranormal.
- *To prepare bibliographies of published materials that carefully examine such claims.
- *To encourage and commission research by objective and impartial inquirers in areas where it is needed.
- *To convene conferences and meetings.
- *To publish articles, monographs, and books that examine claims of the paranormal.
- *To not reject such claims on a priori grounds, antecedent to inquiry, but rather to examine them objectively and carefully.

THE SKEPTICAL INQUIRER (formerly THE ZETETIC) is the official journal of the Committee.

Paul Kurtz, Chairman; Philosopher, State University of New York at Buffalo.
Lee Nisbet, Executive Director; Philosopher, Medaille College.
Kendrick Frazier, Science Writer; Editor, THE SKEPTICAL INQUIRER

Fellows of the Committee:

George Abell, Astronomer, UCLA; **James E. Alcock**, Psychologist, York Univ., Toronto; **Isaac Asimov**, Chemist, Author; **Irving Biederman**, Psychologist, SUNY at Buffalo; **Brand Blanshard**, Philosopher, Yale; **Bart J. Bok**, Astronomer, Steward Observatory; **Bette Chambers**, American Humanist Association; **Milbourne Christopher**, Magician, Author; **Daniel Cohen**, Author; **L. Sprague de Camp**, Author, Engineer; **Eric J. Dingwall**, Anthropologist, Author; **Christopher Evans**, Psychologist, National Physical Lab., U.K.; **Charles Fair**, Author; **Antony Flew**, Philosopher, Reading Univ., U.K.; **Yves Galifret**, Exec. Secretary, l'Union Rationaliste; **Martin Gardner**, Author, *Scientific American;* **C. E. M. Hansel**, Psychologist, Univ. of Wales; **Sidney Hook**, Prof. Emeritus of Philosophy, NYU; **Richard Hull**, Philosopher, SUNY at Buffalo; **Ray Hyman**, Psychologist, Univ. of Oregon; **Leon Jaroff**, Senior Editor, *Time* magazine; **Lawrence Jerome**, Science Writer, Engineer; **Richard Kammann**, Psychologist, Univ. of Otago, Dunedin, New Zealand; **Philip J. Klass**, Science Writer, Engineer; **Marvin Kohl**, Philosopher, SUNY at Fredonia; **Lawrence Kusche**, Science Writer; **Ernest Nagel**, Prof. Emeritus of Philosophy, Columbia; **James E. Oberg**, Science Writer; **James Prescott**, Psychologist, HEW; **W. V. Quine**, Philosopher, Harvard Univ.; **James Randi**, Magician, Author; **Dennis Rawlins**, Science Writer, Astronomer; **Carl Sagan**, Astronomer, Cornell Univ.; **Evry Schatzman**, President, French Physics Association; **Robert Sheaffer**, Science Writer; **B. F. Skinner**, Psychologist, Harvard Univ.; **Marvin Zelen**, Statistician, Harvard Univ.; **Marvin Zimmerman**, Philosopher, SUNY at Buffalo.

Affiliations given for identification only.

Committee sections have been established in Canada, France, Belgium, Germany, Great Britain, and New Zealand. The Committee also has a UFO subcommittee.